

Wall Street Business Case for Sustainable Investment Including Green Bonds with Consensus Underwriting Standards, released at New York Stock Exchange Press Conference (2009-20012).

Reviewed at National Public Meetings at Federal Reserve Bank Offices (2012)

Updated by Leading Economists (2013):

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Consensus Underwriting Standards' 2014 Amendments incorporating Green Bond Business Case led by:

AIA Minnesota  
Appraisal Institute  
Deloitte  
Eaton  
Environmental Bankers Association  
GE  
Impact Infrastructure  
Perkins+Will  
State of California

Additional Peer-review and Co-publication by (2015):

Appraisal InstituteCapital Markets Partnership  
Duke University Nicholas School on the Environment State of California  
UNC Chapel Hill Kenan-Flagler Business School  
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Kenan-Flagler, Duke & g-bit

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# GREEN BOND BUSINESS CASE



Capital Markets  
PARTNERSHIP





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# OUR CHALLENGE TO THE GREEN BOND MARKET



**Gavin Newsom**  
California Lt. Gov. Chairman,  
Capital Markets Partnership



**Jeffrey Hollender**  
Chairman, American Sustainable  
Business Council



**Michael Brune**  
Executive Director, Sierra Club

Dear Readers,

We know investors with over \$70 trillion in assets under management want to buy green bonds.

We know the consensus position of leading financial institutions, governments, and environmental groups is that green bonds are more profitable, less risky and preferred by investors based on extensive peer-reviewed statistically valid data, reports and surveys.

We know the green bond market is vibrant, rapidly growing, with most if not all green bonds selling out due to substantial and pent-up investor demand.

We know sustainable investing is here to stay.  
We know accelerated near term green bond development and issuance can provide a trillion financial stimulus.

We know leading climate scientists emphasize that we need to act now to deploy several trillion dollars in green bonds greatly reducing carbon pollution in the near term, to stabilize the climate and ensure dangerous climate change remains manageable. Also, required climate resilience expenditures are orders of magnitude greater than previously estimated.

We know investors are ready to provide these funds.

We know such a near term financial investment will protect the economy, provide unprecedented social benefits, and ensure a manageable climate.

Data documenting the need and actions required are set forth in this Green Bond Business Case.

We can visualize a market shift occurring and ask you to join in our efforts now marshaling the capital and measuring and guiding progress. Thank you.

Very truly yours,

**Gavin Newsom**  
California Lt. Gov.  
Chairman, Capital Markets  
Partnership

**Jeffrey Hollender**  
Chairman, American Sustainable  
Business Council

**Michael Brune**  
Executive Director, Sierra Club



## EXECUTIVE SUMMARY

This report is based on the findings of over 50 reports, consensus standards, and investor surveys. Between 2008 and today, its insights have been vetted by over 25 leading organizations, such as JPMorgan, Citi, Sierra Club, National Wildlife Federation, Federal Home Loan Banks, and US Conference of Mayors as released at a 2009 New York Stock Exchange Press Conference. These findings were updated by leading economists, such as Dr. Gary Yohe, IPCC, Vice Chairman, US Climate Assessment Report; Dr. Howard Kunreuther, Director, Wharton Center for Risk Analytics; and Dr. Eric Zencey, Vermont University and National Wildlife Federation.

Key findings are that green bonds are more profitable, less risky, and preferred by investors, that can create a substantial financial stimulus, and importantly provide the needed estimated near term \$2 trillion reducing about 18 gigatons of carbon pollution preventing dangerous climate change from becoming permanently unmanageable. “Investors with over \$70 trillion in assets under management want to buy green bonds” (Tillman, 2013).

To highlight the importance of the green bond market to the financial, government, and environmental sectors, consider these trends and sample statistics:

### **Financial industry leaders are making big investments in green bonds.**

- Deutsche Bank plans to buy \$1 billion in green bonds (Bloomberg, 2015). Zurich committed to buy \$2 billion (Zurich, 2014).
- Six large real estate owners, such as Vornado Realty Trust, have issued \$2.3 billion of green use bonds in aggregate (Pyke, 2015).

### **Sectors ripe for green bond investments are now serious markets.**

- The global alternative energy market exceeded \$310 billion in 2014 (Bloomberg, 2015).
- Commercial building owners are expected to invest roughly estimated \$960 billion globally by Navigant between 2014 and 2023 to green their buildings and infrastructure (Clancy, 2014). Some experts believe this capital will come from energy service companies that retrofit and manage buildings as implied by Navigant. Others believe it from the capital markets. The answer is likely to be a combination of both.

### **Green bond investments can pose lower financial risks.**

- The risk of mortgage default is about 33 percent lower for energy-efficient, ENERGY STAR-rated homes (UNC Chapel Hill, 2013). These controlled statistical data are the basis for acknowledgement of higher credit ratings for energy efficiency (Morningstar 2014).
- Investment targets for green bonds do not typically face stranded asset risks –that is, 60-80 percent of coal, oil and gas reserves of publicly listed companies may be “unburnable” or obsolete to meet the needed climate change mitigation plans established by the scientific community (Carbon Tracker Initiative, 2015). Additional green bond market growth causing carbon pollution reductions could create a market shift achieving a long-term manageable climate.

## OUR SPONSORS



## OUR SPONSORS

### **ABOUT UNIVERSITY OF NORTH CAROLINA KENAN-FLAGLER BUSINESS SCHOOL**

Consistently ranked one of the world's best business schools, UNC Kenan-Flagler Business School is known for extraordinary learning experiences for students and executives and innovative research that makes an impact on the practice of business. UNC offers a portfolio of programs led by renowned faculty who are committed to excellence in both teaching and research in accounting, finance, marketing, operations, organizational behavior, strategy and entrepreneurship, and business communication. Its tradition of curricular innovation includes a premier leadership development program; unique areas of strengths in sustainability, entrepreneurship and real estate development; and pioneering use of technology to enhance education and access. Its collaborative culture is based on our core values of excellence, leadership, integrity, community and teamwork. Its graduates – 34,000 alumni in 81 countries – are principled leaders who drive extraordinary results for the bottom line and the greater good.

See more at <http://www.kenan-flagler.unc.edu>

### **ABOUT DUKE NICHOLAS SCHOOL ON THE ENVIRONMENT**

Duke University's Nicholas School is a School of the Environment strives for a new paradigm, one that views and attempts to understand the earth and the environment including humans as an integrated whole. And one that advances a more sustainable future by strategically focusing its resources on addressing the major environmental issues of our times and by training a new and environmentally-informed generation of global leaders. To achieve this vision, the Nicholas School has assembled a unique and talented faculty of world-class researchers and educators spanning all of the relevant physical, life, and social sciences, steeped and actively engaged in their respective disciplines, but also committed to the multi- and interdisciplinary lines of inquiry and collaborations that are at the core of many environmental issues.

See more at <https://nicholas.duke.edu>

### **ABOUT THE APPRAISAL INSTITUTE**

The Appraisal Institute is a global professional association of real estate appraisers, with nearly 21,000 professionals in almost 60 countries throughout the world. Its mission is to advance professionalism and ethics, global standards, methodologies, and practices through the professional development of property economics worldwide.

See more at <http://www.appraisalinstitute.org>

#### **ABOUT G-BIT**

g-bit is a clean energy market research firm providing data subscription services, custom research, and project implementation support in finance, strategy, and innovation in clean energy and green building. g-bit has one of the country's largest databases of curated data points, reports, trends, quantitative tools, energy investors, blogs, and analysis in these two sectors. Beyond data and insights, g-bit also serves as owner's representative for clients to support execution on investments and programs related to its market intelligence. Key collaborators or clients include the US Green Building Council, the American Institute of Architects, Harvard University, University of Cambridge, William McDonough + Partners, PwC, E Source, Make It Right, Duke University, Cherokee Investment Partners, the North Carolina Sustainable Energy Association, and UNC Chapel Hill.

See more at [www.g-bit.com](http://www.g-bit.com)

#### **ABOUT THE CAPITAL MARKETS PARTNERSHIP**

CMP is a nonprofit 501(c)(3) coalition of leading financial institutions, governments, ENGOs, and companies, that documented the sustainable investment and green business case, and is facilitating green bonds to stimulate the economy and prevent unmanageable dangerous climate change.

See more at <http://capitalmarketspartnership.com>

#### **ABOUT THE AMERICAN SUSTAINABLE BUSINESS COUNCIL**

ASBC is a growing coalition of business organizations and companies committed to creating a vision and framework and advancing market solutions and policies to support a vibrant, just and sustainable economy. ASBC and its organizational members represent more than 250,000 businesses and more than 325,000 business leaders across the United States. ASBC is raising up the voice, presence and power of business to create jobs, grow business and build a sustainable US economy on issues ranging from sustainable agriculture, climate change clean water, safer chemicals, high road business, sustainable economic development, fair tax system among others.

See more at <http://www.asbcouncil.org>

# 1.

## GREEN BOND MARKET BASICS

### *DEFINING THE GREEN BOND MARKET*

Green bonds are debt financial instruments that pay regular dividends at a fixed amount that differ from conventional bonds in their design to provide significant environmental and public health benefits by reducing pollution. In practice, they generate both fixed income financial and non-financial returns, both of which are core to the issuance and underwriting process.

Green bonds are categorized along the same lines as conventional bonds: use bonds, project bonds, and securitized bonds, also known as asset-backed securities which for example, could be green building mortgages or solar leases. To date, green bonds have primarily funded renewable energy and energy efficiency projects, but have extended into forestry preservation and land management, green buildings, water efficiency and conservation, and corporate sustainability initiatives.

In recent years, the green bond market has been characterized by rapid growth and maturation towards greater liquidity with a priority for transparency. The size of the green bond market was estimated at \$11 billion in 2013, \$40 billion in 2014, and is expected to reach \$100 billion in 2015 (Climate Bonds Initiative, 2015).

With this growth, green bond issuances have increased in size leading to broader market acceptance and improved liquidity. As the green bond market has expanded, it cannot keep pace with investor demand, as evidenced by the over subscription of most green bonds and unmet investor demand (AFDB, 2014; Bloomberg New Energy Finance (BNEF), 2014; First Acacia Capital, 2015). See Table 1 identifying these benefits.

### *UNDERSTANDING THE DRIVERS OF GREEN BOND MARKET GROWTH*

Many green bonds are designed to explicitly focus on climate change mitigation goals. Strong investor support of green bonds is very likely related to investor public documentation along with leading insurers and governments, of ongoing systemic climate damages in all market segments (Capital Markets Partnership (CMP) 2013; US 2014;). Climate risks and related potential damages from exceeding the estimated safe level of 350 parts per million (ppm) of atmospheric CO<sub>2</sub> (CMP 2008) since atmospheric CO<sub>2</sub> levels currently exceed 400 ppm (CO<sub>2</sub> Now, 2015).

While green bonds serve as a hedge against sectors of the economy (e.g., oil and gas) predisposed to climate-related risk, they also allow investors to take advantage of the growing investment opportunities in the renewable energy, energy efficiency, and green building. Some of these industry innovations are driving investors to respond to the increasing obsolescence risk undermining the long-term value of more carbon-intensive industries and properties.

The World Bank has issued the most green bonds stating on its green bond website a primary purpose is to address climate change (World Bank, 2015):

*"Climate change affects all of us. But it is expected to hit developing countries the hardest. Its potential effects on temperatures, precipitation patterns, sea levels, and frequency of weather-related disasters pose risks for agriculture, food, and water supplies. At stake are recent gains in the fight against poverty, hunger and disease, and the lives and livelihoods of people in developing countries. ... Since 2008, the World Bank has now issued around USD 8.5 billion equivalent in Green Bonds through 100 transactions in 18 currencies."*

Zurich, Deutsche Bank, Goldman Sachs, Citi, and Bank of America announced green bond purchasing programs for many billions of dollars showing support for the green bond market (Bloomberg, 2015). S&P's (2015) and Barclays's (2015) Green Bond Indices are designed to track the market.

In addition to an economic stimulus, green bonds have the greatest potential to mobilize the trillions of dollars needed for dangerous climate change to ensure it doesn't become permanently unmanageable.

#### *EXPECTED GREEN BOND MARKET SIZE*

Substantial and pent-up investor demand and Wall Street fees are expected to greatly accelerate green bond growth. All entities involved in bond structuring, rating, and sale, earn commissions thus providing business models for these entities where there is expected long-term growth like with green bonds.

With more than 2 million green home and 100,000 building mortgages respectively, green property bonds can easily be ramped up providing a 30-year fee-based Wall Street business model with similar business models responsible for the highest growth Wall Street businesses historically like commercial mortgage backed securities globally from 1985 to 2006.

Green property bonds are an estimated \$1 trillion market (CMP, 2009) and green use bonds are expected to be of similar size. Sustainable manufacturing and retailing bonds are nascent but with the potential to be enormous given the size of these industries and the fact that sustainability has great market awareness in these industries.

Even with inherent uncertainties, unabated dangerous climate change represents a well-recognized unreasonable risk, and to be effective in preventing it from becoming unmanageable, enormous capital expenditures are required for both carbon pollution reductions and adaptation, i.e., resiliency. For these reasons and resulting investor preference, the green bond market size is expected to grow and be here to stay for the foreseeable future (UBS 2015).

In light of the many estimates for the large amount of capital needed to transition to a clean economy, the current and potential growth in the green bond market is very promising.







# 2.

## BENEFITS OF GREEN BONDS VS. CONVENTIONAL BONDS

Due to investor demand, most green bonds sell out providing the benefits set forth in Table 1.

TABLE 1

Tangible Economic Benefits of Oversubscribed Green Bonds	
<b>Issuer</b>	Either greater bond proceeds, or cheaper cost of capital as function of the level of over subscription, or both.
<b>Underwriter</b>	Signals a robust market where a large number of deals can be completed. Demand for green bonds is substantial with investors with over \$70 trillion in assets under management that want to buy, thus comprising a long-term fee-based business model
<b>Rating Agency</b>	No apparent advantage from a rating perspective. From a business perspective, same view as underwriter.
<b>Investor/Bond Purchaser</b>	Demonstrates a more liquid market reducing risk

### FINANCING THE CRITICAL CLIMATE MITIGATION EFFORTS

Green bonds one promising means to generate a substantial portion of financing investment to adequately address the challenge of managing climate change risks to society. A number of factors substantiates the claim that a mature green bond market can serve in this capacity: (1) the exponential growth of the market, (2) vast unmet investor demand, and (3) attractive business models in industries that can perform critical climate mitigation functions.

### MANAGING CLIMATE RISK IN THE FINANCIAL SYSTEM

All indications point to a rapidly maturing green bond market that brings with it a host of attractive ancillary benefits. Credit ratings, for instance, are a critical factor in market valuations. Rating agencies such as Standard and Poor’s are starting to express concern about the potential impacts of climate change on their credit rating models (S&P 2014; CMP 2014). The green bond market can provide an avenue through which to raise capital to avoid climate credit downgrades. As the financial industry is increasingly focused on how to factor in climate risk, this can stimulate other markets, such as substantial growth in carbon credits and offsets, that can help to further climate change mitigation efforts across many industries.

Previously recognized as an intangible benefit, added green bond brand benefits can now be monetized as a tangible benefit (First Acacia Capital 2014). Increased brand from green buildings is an important benefit within the green building market (Id.). Oversubscription of green bonds appears to be a per se increase in brand value for private sector bond issuers.

#### *CAPITALIZING ON GROWING INVESTMENT OPPORTUNITIES IN SUSTAINABLE INDUSTRIES AND PROJECTS*

Green bond lower cost of capital is attracting a host of entrants into the green bond market from real estate, manufacturing, and retailing, which can offer attractive value propositions to investors based on traditional metrics of profit and risk. Improved brand is also a factor (First Acacia Capital 2014).

Independent of the green bond market, these industry leaders in sustainability are gaining market share and prominence in the business and investment world. Comment. As an example, consider that the US green building annual market is roughly \$554 billion (Skanska 2013), with about 44% of new construction and retrofits as green and represents roughly 20 percent of all new US commercial real estate construction (McGraw-Hill 2013).

Many investors are facing environments in which they are being led down the path of shifting their portfolios to more sustainable, often less carbon-intensive investments. New mandates and directives for institutional investors, pension funds, and endowments are guiding investment flows into green investments, and increasingly into the green bond market. One example is the divestment initiative in which over 800 institutional and private investors around the world are committing to remove more than \$50 billion of investments in all or parts of the fossil fuel sector (Divest-Invest, 2014).

#### *GREEN PROPERTIES, SUSTAINABLE INVESTMENT AND MANUFACTURING ARE MORE PROFITABLE, LESS RISKY, AND PREFERRED BY OTHERS*

This Green Bond Business Case includes national statistically valid data showing that green properties have highest rents, occupancy, valuation and substantially fewer defaults. The Business Case also concludes that based on successful precedent, green and resilient property bonds are projected to create a trillion dollar economic stimulus, 800,000 new jobs, and \$400 billion in new wages (CMP 2009; Energy Future Coalition (EFC) 2010).

Green properties are more valuable and market share is substantially past the tipping point. Green buildings are 44% of all new construction and retrofits (McGraw-Hill 2013) and about 80% of all new homes by national builders are green being ENERGY STAR or LEED Certified (CMP 2013-2). Statistically green buildings have highest building occupancy, rents, and valuation (CMP 2013). Green homes are 9% more valuable in California (Kok 2012). Pursuant to the consensus productivity underwriting standard, green properties improve average occupant productivity by 5%-15%, and increased mean project ROI of 359% is shown from 29 case studies with a range of 3%-1517% increased ROI. These findings are consistent with statistically comparable value increases for 108 green retail stores with a 40% average sales increase per store (MetLife 2013; RELi 2014).

## BENEFITS OF GREEN BONDS VS. CONVENTIONAL BONDS

Former US Treasury Under Secretary Mary Miller and Federal Reserve Board Chairman Ben Bernanke, requested staff review of the Green Bond Business Case economic and social benefits to encourage market support and protect against financial contagion from dangerous climate change (CMP 2010):

*"Green Buildings Have Higher Rents, Selling Prices & Asset Values as Shown By National Statistically Valid Data. The Quigley Berkeley et al. studies Doing Well By Doing Good & Sustainability & the Dynamics of Green Buildings, ... document with peer reviewed national statistically valid data/controlled studies, that green buildings:*

- *Have three percent per square foot higher rents than conventional*
- *Have six percent higher effective rents than conventional (not on a square foot but on a contract basis)*
- *Have selling prices 16 percent higher than conventional*
- *During the 2007-2009 down market, had rents and asset values still higher than conventional buildings with no significant decline in green building value*

*Doing Well uses a national sample size of 10,000 subject and control buildings and was funded in part by EPA. ... Sustainability uses a sample size of 27,000 buildings. The green buildings in the studies are LEED and ENERGY STAR certified buildings."*

*"Investors Prefer Green Building Securities (GBS). Aggregation of securities of 100% green buildings (GBS) are preferred by investors as documented and contained in the Briefing Paper's Investor Survey initiated with S&P covering over \$3.3 trillion in assets with investors stating without exception that they will buy GBS. Similar results were obtained by Allianz Global Investors' surveys."*

For green homes, UNC Chapel Hill Kenan-Flagler Business School conducted a statistically valid study of 71,000 homes in 39 States, documenting that "default risks are on average 32 percent lower in energy-efficient homes, controlling for other loan determinants" (UNC Chapel Hill 2013).

Added green home value was documented in a statistically valid study by Kok (2012) determining that in an evaluation of 1.6 million homes sold in California between 2007 and 2012, that these green homes are worth more adding a 9 percent price premium:

*"The study controlled for key variables that influence home prices including location, size, vintage, and the presence of major amenities such as swimming pools, views and air conditioning. Considering that the average sales price of a non-labeled home in California is \$400,000, the price premium for a certified green home translates into some \$34,800 more than the value of a comparable home nearby."*

As part of Green Property Bond structuring, investors with over \$600 billion in assets under management executed expression of interest letters to buy the bonds (First Acacia Capital 2013-2014).



Further, the peer-reviewed Capital Markets Briefing Paper and its background documents (CMP 2009) were prepared as part of this Green Bond Business Case and released at a New York Stock Exchange Press Conference concluding at pages 1-9, that:

*“The environmental and economic findings of this due diligence are summarized below, and conclude that green buildings, certified sustainable manufactured products and sustainable investments are more profitable than conventional, substantially reduce risk, provide much needed social benefits, and are preferred by investors in the Survey initiated with S&P included this Paper covering over \$3.3 trillion in assets.”*

## BENEFITS OF GREEN BONDS VS. CONVENTIONAL BONDS

*In March 2009, peer review of this Briefing Paper was initiated by the following 20 leaders from prominent financial institutions, environmental groups, professional firms, associations, and government:*

- **Hon. Gavin Newsom**, Mayor, City & County of San Francisco, representing the US Conference of Mayors, Chairman, Capital Markets Partnership
- **Lauralee Martin**, Global COO/CFO, Jones Lang LaSalle
- **Jeff Perlowitz**, Citi Global Head of Securitized Markets
- **Lewis Jones**, Managing Director, JPMorgan
- **Carl Pope**, Executive Director, Sierra Club
- **Mario Silvestri**, Vice President, Wells Fargo Wachovia, Vice Chairman, National Consensus Green Building Underwriting Committee
- **Corey Brinkema**, President, Forest Stewardship Council
- **Toby Rittner**, President & CEO, Council of Development Finance Agencies
- **Larry Schweiger**, President & CEO, National Wildlife Federation
- **Dr. Matthew Kiernan**, CEO, Innovest Strategic Value Advisors
- **Jeff Telego**, Co-Executive Director, Environmental Bankers Association
- **Robert Dischert**, President, Clean Planet Funding
- **Phil Harrison**, Chairman & CEO, Perkins+Will
- **Bill Valentine**, Chairman, HOK
- **Bob Bailey**, Chief Underwriting Officer & Sr. VP, Fireman's Fund/Allianz
- **Anne Laird-Blanton**, ALB Designs, Director, American Institute of Architects
- **Ken Willis**, Sr. VP & Director, Federal Home Loan Bank Boston, Vice Chairman, National Consensus Green Building Underwriting Committee
- **Paul Epstein**, MD, MPH, Harvard University Medical School, Center for Global Health & Environment
- **Bill McInerney**, Partner, Cadwalader, Wickersham & Taft, LLP, Chairman, CMP Sustainable Investment & Financing Committee
- **John Eric Nelson**, Managing Partner, Wall Street Without Walls

*Peer review was completed in July 2009, all comments were positive, no substantive changes were made, and the Paper was finalized.*

*As part of the peer review, the Briefing Paper and Background Documents were transmitted to all 70 CMP Partners and about 200 interested parties. The Background Documents are:*

- *Creating and Economic Stimulus While Stopping Climate Credit Risk/Irreversibility®*
- *National Consensus Green Building Underwriting Standards*
- *Green Building Value Rating System® 2.0*
- *US Conference of Mayors Resolution Supporting the Sustainable Investment Initiative*
- *Peer reviewed Economic Benefit Standard® for Green Buildings, Clean Vehicles & Certified Sustainable Manufactured Products*

**Jeff Perlowitz**, Citi Head of Global Securitized Markets says “We were pleased to facilitate the due diligence process by providing Standard and Poor’s and the market with documented evidence that investments in green buildings reflect less risk and provide added value. A nonprofit public charity like the Partnership consisting of investment banks, investors and government, is an excellent way to transparently disclose value and increase investor confidence in the due diligence through an accredited and audited consensus process.”

*“Economic and Environmental Findings. This report also reviews independent research on the economic benefits and market growth of the green building finance and sustainable investment industries, as well as on these sectors’ environmental benefits. Key findings are the following:*

- *Commercial and residential occupants will pay premiums for green properties. 2007 global data collected by CoreNet Global and Jones Lang LaSalle demonstrate that 7 of 10 commercial occupants will pay a rental premium to occupy space in a green property. RCLCO’s 2007 study of American homebuyers found that majorities of homeowners would pay a premium for a green home, provided that the premium was paid back in five years. Some homebuyers– including 41% of buyers motivated by health and wellness– would pay a premium even if no payback was received.*
- *Aggregate data on building performance suggest that green buildings command higher rents, occupancy and sale prices. The bulk of the aggregate data are drawn from information assembled by CoStar Group, the real estate information reporting service. Analyses performed by CoStar, RREEF and the University of California at Berkeley suggest that rental rates, occupancy levels and sales prices are higher for certified green buildings. The aggregate studies appear to validate earlier case studies suggesting accelerated leasing and periodic rental premiums for green buildings.*
- *The green real estate investment market is sizable and profitable for financial institutions. The green building market is growing far more rapidly than the U.S. and global economies. Despite this growth, occupant demand continues to outstrip available supply. 2007 findings from the global CoreNet Global/Jones Lang LaSalle study indicate that 84% of corporate occupants believe that the supply of green buildings is non-existent, minimal, limited or patchy in the markets in which they operate. Further accelerating market growth are long term rising conventional energy prices, regulatory changes and concerns about climate change. The data suggest that the green building sector will be characterized by strong growth, limited supply and strong demand over the next several years (TIAA-CREF Asset Mgmt. Report July 2008). Green building investment is down in 2009 due to the economy, but it is holding up much better than conventional real estate investment.*
- *Sustainable investment increases investor value, substantially reduces risk, and provides substantial social benefits. New financial products that are “off” conventional energy and sustainable are critical.”*

## BENEFITS OF GREEN BONDS VS. CONVENTIONAL BONDS

The peer-reviewed Economic Benefits Standard Background Document released at the New York Stock Exchange Press Conference, identified from numerous reports and case studies, that sustainable investment and manufacturing reduces costs and can be more profitable.

*“Avoided pollution control costs ... have been monetized using EPA published costs of pollution control. ... 1) Air pollutants- \$208.60/ton; 2) Water pollutants - \$11.27/ton; 3) Solid waste - \$104.01/ton; 4) Hazardous waste - \$24.01/ton; 5) Leaking underground tanks - \$3,958.60/tank; 6) Pesticides -\$1.35/pound of active ingredient; 7) Toxic chemicals – \$.16/pound; 8) Climate change gases - \$24/ton. Additionally, there are pollution damage costs to human health and environment not included in these figures.”*

### 1.1 Positive Correlation of Sustainable Performance & Superior Economic Performance.

*“As nearly every study shows, companies with better environmental performance consistently achieve superior financial and stock market performance,” (The Future of the Forest Industry, Maximizing Environmental Benefits and Market Returns, World Wildlife Fund 1999).*

*The body of evidence that there is a positive relationship between environmental and economic performance takes several forms.*

Empirical Studies. *The first is the number of empirical studies that have reached this conclusion. Representative of this is research led by a professor at the University of Oregon Business School showing that companies with superior environmental performance, outperform others economically, and that this effect is greater in high-growth industries (A Resource-Based Perspective on Corporate Environmental Performance and Profitability, 40 Acad. of Mgt. 1997).*

Environmental/Sustainable Investment Funds Outperform Conventional Funds. *A second category is the performance of actual portfolios using various measures of environmental performance as decision-making criteria. A review of nine investment funds yields a similar conclusion. Of four funds that have operated for more than a year, three have significantly beaten their relative benchmarks over three and five year periods (five other funds performed well but their results are too short-term for meaningful analysis). Emerging Relationship Between Environmental Performance and Shareholder Wealth (Assabet Group 2002).*

Methodology. *Performance information is used or a statement how each fund/index has performed against its benchmark.*

*Funds Evaluated by Finance Institute for Global Sustainability (FIGS) Annual Review of Eco-efficiency Funds (2000) at 16: “Of the 26 funds that measured themselves against a benchmark, 19 have outperformed their benchmark. In light of [weak] stock market performance over the past year, the relatively strong performance of eco-efficiency funds during 2000 may be an indication that proactive environmental management may benefit companies during bull and bear markets.” Eco-efficiency funds are those that offer investment opportunities in leading environmental companies and seek superior financial returns. In contrast, “socially responsible” funds may be willing to accept some diminished return for assurance that investments promote a social or environmental agenda.*

*Portfolio 21 Methodology (This fund is currently under-performing its benchmark): Portfolio 21 companies must be publicly traded and are chosen where the leaders of a company must have made an explicit commitment to sustainable business practices and allocated significant resources to achieve its goals. Then, through a detailed industry profile, we identify the most critical ecological impacts and issues the company and its industry face. Next, the company is scored against criteria tailored to its industry group and is compared with its competition in such areas as the ecological aspects of its product range, the life-cycle impacts of its products and services, relationships with suppliers, investments in sustainable technologies and processes, leadership, resource efficiency, and environmental management.*

*SAM Sustainability Pioneer Fund (actively managed global small cap)*

*Eco-Value '21 (passive US domestic large cap enhanced index)*

*The Sustainable Performance Group (actively managed global all cap)*

*Industry Studies. A third category of evidence is to be found in financial analysis of the economic significance of environmental issues in particular industries. Two studies by the World Resources Institute quantify the financial significance of environmental issues for specific companies in the wood products and oil and gas industries (Pure Profit, The Financial Implications of Environmental Performance, World Resources Institute 2000 and Changing Oil, WRI, 2002).*

*As shown in section 6 below, sustainable products can be more profitable than conventional products in summary because they create more value through:*

- *Margin improvement*
- *Risk reduction*
- *Growth enhancement*
- *Greater capital efficiency*

*6.1 Summary on Profitability. Consensus benefits of sustainable products over their life cycle including suppliers, show they can be more profitable than conventional products ..., with numerous citations & examples:*

- *Reduced liability*
- *Fewer regulatory constraints*
- *Faster product time to market*
- *Improved corporate good will, brand, competitive advantage*
- *Documented public demand due to global health & environmental benefits*
- *Reduced costs for raw materials and manufacturing*
- *Deliver added value to consumers*
- *Improved employee health and safety*
- *Improved product design*
- *Increased worker productivity through reduced time for compliance & liability*
- *Increased sales margins*
- *Address social equity*



## BENEFITS OF GREEN BONDS VS. CONVENTIONAL BONDS

A key finding in terms of added profitability for manufacturers is that increased efficiency of manufacturing operations over the supply chain by reducing pollution and carbon energy use, is key to increasing profitability by lowering operating costs, avoiding regulatory compliance and environmental liability, and improving brand. The Forbo Flooring Case Study validated by third party sustainable product certification shows from 2001- 2011 (Forbo 2001-2011):

- *EBIT (Operating Result) performance as a percentage of sales that is, at a minimum, averaging 14% better than any of its competitors over 10 years. EBIT is earnings before interest and taxes.*
- *Internal profitability shows its sustainable products' EBIT level performance more than double, as a percent of sales, those of traditional products.*
- *Five year share price performance continues to be 100% greater on average than its three largest competitors.*

Manufacturers and retailers are more profitable where at least 25% of their products are certified to leadership sustainability standards covering all products and vehicles (RELI 2011).

An update to the preceding Business Case reports was made by leading economists (CMP 2013 at 1-2) concludes that a robust green bond market can reduce systemic climate damages, protect the capital markets from these risks including financial contagion, and provide substantial social benefits:

*“There are extensively documented and substantial global financial benefits from accelerating the global green building secondary market; this market primarily issues bonds. One unappreciated benefit is that this market can significantly reduce, and perhaps even eliminate, unacceptable near term risks to the world’s financial markets imposed by dangerous climate change. Reliable peer reviewed estimates are that \$2 trillion or more are needed to reduce 18 gigatons of CO2 emissions, stabilize the climate, and mitigate risks to financial markets through the exposure of insurance companies to unprecedented claims and documented ongoing systemic damages in a number of other sectors.*

*The global green building secondary market can easily provide this investment funding through the issuance of fixed-income bonds. In addition, this secondary market is expected to:*

- *Accelerate global green building equity investment*
- *Shift the market significantly by large scale investment in profitable green building and energy technologies*
- *Overcome the ideological gridlock and bias that currently prevent policy makers from effectively dealing with the unprecedented and unacceptable risks of climate change*
- *Stimulate additional government action reducing climate pollution If other programs similar to the global green building secondary market can be identified that are also poised to provide a financial stimulus and the needed trillions of dollars for near term substantial pollution reductions, they should be pursued as well.*

*This Report advances several related points in making its case:*

- *In many regions of the world, systemic climate change damages are rising, and this increase threatens financial markets.*
- *Pervasive bias, including negative market responses to disruptive clean energy technologies, prevents accurate recognition of the risks to financial markets posed by climate change. Acceleration of the green building secondary market will help overcome this bias.*
- *The safe level for climate pollution is 350 parts per million (ppm) CO<sub>2</sub>. We are currently at a dangerous level of 400 ppm and rising rapidly.*
- *There are many well-documented environmental tipping points at which additional incremental change can trigger irreversible, and highly detrimental, systemic change—change that threatens global financial markets.*
- *Similarly, the financial economy has tipping points at which further incremental change brings about rapid systemic change—escalating crises of debt repudiation, deleveraging, sudden shifts in market expectations and investors' confidence and panic which is commonly called "contagion."*
- *The irreversibility of tipping points and the calculations of needed reduction in climate change pollution to stop Irreversibility are well defined by leading climate scientists and leading financial institutions.*
- *The expected manifestation and negative effects of unacceptable climate change credit risks from financial contagion.*
- *It is possible to predict the expected manifestation and negative effects of unacceptable climate change credit risks from financial contagion.*
- *Proposed solutions and responses to climate change credit risk and contagion fall into distinct categories.*
- *Our analysis leads to a clear program to stimulate the economy and also stop climate change credit risk, including the risk of contagion.*
- *Appendix: Slides showing green buildings have top of the market rents, occupancy and valuation based on national statistically valid data released at the NYSE."*

#### *OPENING UP EQUITY INVESTMENTS*

Acceleration of green bonds including green property bonds also opens up green equity (direct) investments in projects, companies, properties and portfolios through greater recognition of added green asset and property value. Confusion over added green and sustainability value was recognized as the leading factor in additional capital formation for many green building private equity funds. The typical real estate private equity investor did not understand favorable green property economics (CMP 2002-2013).

Acceleration of equity investments as a result of green bond market success and value recognition is expected in leadership sustainability industries covered by green bonds.

# 3.

## GREEN PROPERTY BONDS AS A KEY SUBSET OF THE BROADER GREEN BOND MARKET

### *USING GREEN PROPERTY BONDS TO CATALYZE GREEN BUILDING RETROFITS GLOBALLY*

Green bonds encompass various types of bonds over many industries. This report explores the green property bond market as a subset of the larger green bond market. The building industry, encompassing commercial, residential, and infrastructure development, is the world's largest, responsible for approximately 40 percent of global greenhouse gas (GHG) emissions (UNEP, 2009). This report explores the potential of the building industry to make substantial climate mitigation efforts through the deployment of a robust green property bond market. As indications of the potential here, consider green bond property issuances as use bonds for green building construction funding by Vornado Realty Trust, Regency Centers, Unibail-Rodamco, Vasakronan, Stockland, and Digital Realty Trust, which total more than \$2.3 billion in aggregate (Pyke, 2015).

### *RECOGNIZING THE SUPERIOR PERFORMANCE OF GREEN PROPERTIES VERSUS CONVENTIONAL PROPERTIES*

A green building secondary market fueled by green property bonds, especially mortgage-backed bonds, holds the potential to catalyze large-scale building stock retrofits and contribute to climate change mitigation goals. If the market reaches its potential, it has been estimated that green and resilient property bonds could create a \$1 trillion dollar economic stimulus leading to 800,000 new jobs and \$400 billion in new wages (EFC 2010; CMP 2013). Resiliency covers carbon pollution reduction and climate adaptation.

Green buildings comprise about 44% of all new US construction and retrofits, and the new homes market is similar with the top 20 national builders constructing about 80% of their new homes as green/energy efficient. This trend for new national builder homes started during the Great Recession when builders determined that green homes sell faster (CMP 2011). One of these national builders Meritage Corp., an energy efficiency market leader, is committed to issuing Green Home Bonds (Meritage 2013). Green home bonds are expected to cause competition by incorporation into the bonds of new attributes not now used by ENERGY STAR homes, but increasing green home value including (1) commissioning (checking to ensure the home is built as designed), (2) integrative process (IP) reducing construction costs and risk as identified by Fireman's Fund's IP Risk Reduction Statement (Fireman's Fund 2011), (3) Lacey Due Care Standard Certification ensuring through a legally binding certification and legal opinion, that the wood is legally logged and thus lawfully possessed and not contraband (Lacey 2012).

Green property bonds backed by mortgages are amenable to rapid deal flow (many bonds issued over a short time) to achieve the substantial near term financing needs for climate change.



## GREEN PROPERTY BONDS AS A KEY SUBSET OF THE BROADER GREEN BOND MARKET

### *COMPETITIVE ADVANTAGE OF GREEN PROPERTY BONDS*

Why are green buildings documented as more profitable: (1) much lower operating costs, (2) less risk of increasing carbon energy price volatility and reduced reliability (3) faster tenant lease-up, higher tenant retention, higher occupancy (4) substantially cheaper construction costs when using integrative process, (5) less risk of building failures, (6) discounted insurance based on improved green building insurance loss ratios from Fireman's Fund, (7) improved occupant productivity from clean air, improved daylighting, and views (RELI 2014), (8) increased sales from green stores documented with statistically valid data for Walmart and Target by Pacific Gas & Electric (Id.), (9) increased deposits in PNC green bank branches as measured statistically by Notre Dame University with its LEED branches having \$1,000,000 more each in deposits, \$461,300 in added sales per employee, and \$675 lower utilities/yr. than conventional branches (Notre Dame 2013), (10) improved valuation Berkeley Haas Business School Reports (2008, 2009 & 2010), (11) statistically valid data showing substantially less mortgage/loan defaults (UNC Chapel Hill 2013).

Underwriting standards' Green + Resilient Value Score certification requirements measure added economic value and cover homes, buildings, infrastructure, manufacturing, retailing, and vehicles in compliance with Federal Trade Commission Environmental Marketing Guides by qualified professionals.

*Underwriting Green Value Score* is incorporated in the appraisal by the Appraisal Institute Model Green Building and Home Valuation Scopes of Services as well as this Business Case since appraisers evaluate all relevant data based on their license requirements (Appraisal Institute 2012). The MetLife and Harper Court Certified Green Appraised Value case studies document this important feature since real estate globally is valued by the appraisal.

### *HIGHER CREDIT RATINGS*

In a review of the preceding statistically valid data on added green property value by the university studies, Morningstar acknowledged higher energy efficiency rating credit for green property bonds where validated for each property by underwriting standard 25-100 Green Value Scores (Morningstar, 2014). Primary reliance for this acknowledgement was the UNC Chapel Hill Kenan-Flagler Business School Home Energy Efficiency & Mortgage Risk Report documenting 32% fewer defaults from energy efficient properties (UNC Chapel Hill, 2013).

TABLE 2

<b>Competitive Advantage: Green Property Bonds</b> for investors, underwriters, issuers		
Attributes	Green Properties	Conventional Properties
<b>Market Share</b>	44% of new construction & retrofits for buildings, about 80% of new national builder homes	Vast majority of existing properties
<b>Commissioning</b> insures property built is designed	Required for Green Bonds. At least \$1 per 2ft in added value	Not required. Added risk & expense
<b>Integrative Process</b> aligns principals in project life cycle reducing risks and construction costs	Required for Green Bonds. Reduces construction costs by 1% - 10% & risk	Not required. Added risk & expense
<b>Statistically Added Economic Value</b> & improved insurance loss ratios	Buildings have top of market rents, occupancy & valuation. Homes 9% more value in CA. Insurance discounts. Multiple green attributes have greatest value	Well documented obsolescence risk for new construction & retrofits
<b>Investor Preference &amp; Brand</b>	Green Bonds selling out - Pent up demand. Measurable brand increase.	Vast majority of existing bonds
<b>Improved Indoor Air Quality</b>	Faster lease-up, greater tenant retention, healthier products, higher Green Value Scores	Not measured
<b>Save Energy &amp; Water</b>	Green Bond energy efficiency minimum. Highest Green Value Scores for most efficient properties	Subject to growing regulatory constraints & costs
<b>Reduced Carbon Pollution/Climate Risk</b>	Highest underwriting Green Value Scores for greatest reductions	Subject to growing regulatory constraints & costs
<b>Occupant Productivity</b>	Increased project ROI by 1350 - 1200%	Not measured
<b>Relation to Transit</b>	Higher Green Value Scores for transit	Not measured
<b>Resiliency</b>	Resilient Standard Value Score	Increasing risks & costs
<b>Higher Ratings Acknowledged</b>	Statistically fewer defaults for energy efficiency. Validated per property with Green Value Score.	Not measured
<b>Industry Size &amp; Liquidity</b>	\$450b/year industry. 200% green bond growth	Vast majority of market
<b>Bond Yield</b>	Same now. Likely yield advantage as market recognizes green value	Subject to greater volatility

# 4.

## MARKET VALUE AND SHARE OF LEADERSHIP SUSTAINABILITY INDUSTRIES FOR GREEN BONDS

Leadership sustainability standards have been recognized for many years as substantially reducing pollution (Leadership Standards Campaign 2011). Green bonds are supporting industries that have found market traction, and green bond financing could provide the infusion of capital needed for important clean energy transition and climate mitigation projects.

The work in developing and updating leadership standards spans some 30 years and includes millions of professionals with environmental groups, government, and industry achieving consensus on these difficult but critically important issues. Given the controversy, complexity, and work needed to develop and approve leadership standards significantly reducing pollution, the green bond market can take advantage of these standards and thus prevent greenwash and maintain the added value of green bonds.

### *MARKET VALUE*

In descending order, following is the estimated dollar value of leadership sustainability industries.

- Certified green properties: a \$554 billion/yr. US industry (Skanska 2013) with a likely equal size outside the US.
- Global solar power: the industry value is \$91 billion/yr. (Statistica Solar 2013)
- Clean vehicles: \$69 billion/yr. globally for high fuel efficiency hybrids and electric vehicles (Idea TechEx 2013). Clean vehicles are defined by the Clean Vehicle Standard e.g., Fed Ex hybrid trucks achieving the Clean Vehicle Standard is incorporated in the underwriting standards, and have at least 90% less tailpipe emissions, 50% better fuel economy, and use fewer materials including toxic materials as compared to conventional vehicles (FedEx 2001)
- Global wind power: the industry value is \$58 billion/yr. (Statistica Wind 2015)
- Certified organic products: a \$40 billion/yr. US industry (Organic Trade Association 2015; Transparency Market Research 2013) and equal global market value
- Forest Stewardship Council (FSC) certified wood: about \$40 billion/yr. market value adjusting for growth (FSC 2008 & 2010)



#### *MARKET SHARE*

In descending order, covered below is the market share of leadership sustainability industries defined as the percentage of an industry or market's total sales that is earned by a particular industry at a set time.

- New green homes. About 80% of all new US homes by the top national builders are green (CMP 2011)
- New or retrofitted green buildings. About 44% of all new US building construction and retrofits are green, way past the tipping point (McGraw-Hill 2013)
- Wind and solar. About 11% for wind and solar combined of all energy sources (US EIA 2010)
- Clean vehicles. About 10% for clean vehicles as measured by fuel economy, tailpipe emissions, and materials (Statistica 2014; Idea TechEx 2013). Mandated fuel economy standards and competition are driving improvements.
- Certified organic products. About 5% for certified organic products (MTS 2013; OTA 2015).
- FSC Certified Wood. About 3% US and 6%-7% EU for FSC certified wood (FSC 2010-2; Rainforest Alliance 2006; FSC 2010-3; Greenlink Forest Stewards 2011); MTS (2015).
- Certified sustainable products. Multi-environmental and social attribute leadership certified sustainable products market penetration is growing but negligible due to substantial global greenwash.



## MARKET VALUE AND SHARE OF LEADERSHIP SUSTAINABILITY INDUSTRIES FOR GREEN BONDS

### *WELL-RECOGNIZED OBSOLESCENCE RISK OF NON-GREEN TECHNOLOGIES*

Once a leadership sustainability standard achieves a certain tipping point of market share, it creates obsolescence risk for the competing conventional technology by reducing and eventually stopping its competitiveness. This is also true historically for any technology, for example the telegraph supplanted the pony express. Technologies that cause their competitor to become obsolete are also called disruptive technologies and displace the earlier technology.

There is a well-recognized obsolescence risk of conventional properties, and carbon intensive and other polluting industries, from growing leadership sustainability industries. Leadership sustainability standards are disruptive, displacing the status quo. Green bonds are accelerating this obsolescence risk.

Due to substantial green building market share, obsolescence risk for new and renovated conventional buildings from green buildings has been written about extensively. Although less well known, obsolescence risk from leadership sustainability standards is a factor in the products market for food, fiber, wood and paper industries. Also, due to accelerating dangerous climate change, carbon intensive industries competing against Green-e renewable power are threatened and can create stranded assets, or obsolete facilities that must be shut down because they are no longer competitive economically.

In the next several years, well documented obsolescence risk is expected to substantially increase current 44% green building market share, meaning that newly constructed and renovated properties that are not green will tend to have risks similar to properties without air conditioning or elevators as written by Deutsche Bank (2007) and Jones Lang LaSalle (JLL) (2013). JLL is a global property management, development, and capital markets firm emphasizing obsolescence to conventional real estate risk from green/sustainable buildings:

- *Sustainability obligations will accelerate the need for demolition of obsolete buildings but on the other hand lead to an opposing pressure to recycle and refurbish existing space.*
- *Sustainable refurbishment and asset management will result in a raft of profitable advantages beyond cost efficiencies; most importantly it will become synonymous with value protection.*

Organic products' effect on conventional products has trends increasing obsolescence risk. Whole Foods has greatly benefited from the halo effect of organic foods and organic products it sells, which increases sales of non-organic products sold at Whole Foods and similar stores selling organic products (MTS 1994-2001). This mark-up in prices due to consumer demand has given the company the nickname "Whole Paycheck." Given that over the years Whole Foods has greatly increased the national scope of its stores in all major markets due to demand, and it uses many new product suppliers not present in conventional food stores, market share of Procter & Gamble products supplied to conventional stores but not to Whole Foods, has shown significant decline (MTS 2012). Procter & Gamble profitability over this same timeframe declined resulting in a CEO change (Forbes 2013). FSC wood and paper affect conventional wood has trends increasing obsolescence risk. FSC Certified Wood use in the paper sector has achieved significant market growth by leading

manufacturers including most recently Kimberly-Clark (Kleenex) and 3M for Post it Notes in well-publicized announcements (Minnesota Public Radio 2015). Home Depot, Office Depot and Staples have promoted FSC products they sell for some time. This progress has been greatly enhanced through successful negative campaigns against conventional wood and paper consumer product companies over the last 15 years by environmental groups like the Sierra Club, Greenpeace, and Forest Ethics. These campaigns have been extraordinarily effective since leading consumer product companies seek to avoid the resulting brand destruction.

Green-e Power and carbon intensive industries has trends greatly increasing obsolescence risk, and increasing the value of energy efficiency. The science of climate change is now undisputed by the scientific community. The few remaining contrarians have conflicts of interest by receiving funds from carbon polluters, sometimes undisclosed in violation of ethics rules. This science shows that in order to prevent dangerous climate change from becoming unmanageable, not only must there be a near term 18 gigaton carbon pollution reduction, but eventually, carbon pollution must cease (CMP 2009-2). See also section below on Making Climate Risk Manageable.

Accordingly, carbon intensive industries are experiencing substantial government regulatory pressure to reduce carbon pollution by EPA rules in response to the Supreme Court's decision in *Massachusetts v. EPA* (Apr. 2, 2007), that carbon pollution is pollution regulated by the Clean Air Act. Key States have also been very aggressive regulating carbon pollution including California.

Private sector litigation and regulatory efforts have also been effective including the Sierra Club's Beyond Coal Campaign with \$60 million in funds from former NYC Mayor and Bloomberg CEO Mike Bloomberg. The Campaign has shut down an estimated 30% of US coal fired power plants, almost completely stopping any new plants, and drove away large investors from mountain top removal coal mining (CMP 2009-3). The coal industry acknowledged the Campaign's effectiveness (Politico (2015):

*"They're sophisticated, they're very active, and they're better funded than we are," says Mike Duncan, a former Republican National Committee chairman who now heads the industry-backed American Coalition for Clean Coal Electricity. "I don't like what they're doing; we're losing a lot of coal in this country."*

## MARKET VALUE AND SHARE OF LEADERSHIP SUSTAINABILITY INDUSTRIES FOR GREEN BONDS

This scientific consensus on dangerous climate change has (1) increased the risk for carbon intensive industries of stranded assets whereby facilities will be shut down, and (2) made them vulnerable to growing investor divestment campaigns like the Keep it in the Ground Campaign led by The Guardian newspaper (2015).

Litigation against major carbon polluters is also a significant risk given that much needed resiliency financing is estimated to be orders of magnitude higher than the \$ billions the States calculated in Connecticut v. AEP (June 20, 2011) where the Supreme Court ruled that State damage claims against carbon polluters are available as communicated to Standard & Poor's (S&P) by Coalition on Climate Credit Ratings, May 20, 2015. Given the enormous costs for resiliency, it is highly likely that taxpayers will want polluters to pay too.

Dangerous climate change is accelerating including from the latent effect of atmospheric carbon pollution already present. Thus, regulation, stranded assets, and divestment adversely affecting carbon intensive industries are only likely to intensify, in turn increasing obsolescence risk that will continue to benefit Green-e Power industries including solar and wind, and energy efficiency.

An additional driver of obsolescence risk is S&P consideration of transparent consensus criteria for rated entities to achieve to avoid planned climate credit rating downgrades based on accelerating global systemic risks from dangerous climate change in all economic sectors. The criteria would likely affect green bonds and stimulate resiliency financing to achieve higher credit ratings and prevent destructive credit rating downgrades. S&P's announced planned credit rating downgrades for dangerous climate change on May 14, 2014 (S&P 2014). See Figure 2 below for implications.



# SOLVING CLIMATE CREDIT RATING DOWNGRADES

## CHALLENGE

Near term Climate Bubble/Crash can be triggered by:

- Pending climate credit downgrades, and/or
- Imminent litigation over collapse of coastal property values from faster rising seas

### Accelerating Forces

- Lack of insurance for climate damages/resilience
- Several trillion dollars must be spent on near term solutions
- JPMorgan predicts unmanageable dangerous climate change is a near term high probability *Black Swan* statistical event
- Time is of the essence: triggers can happen now

## SOLUTION

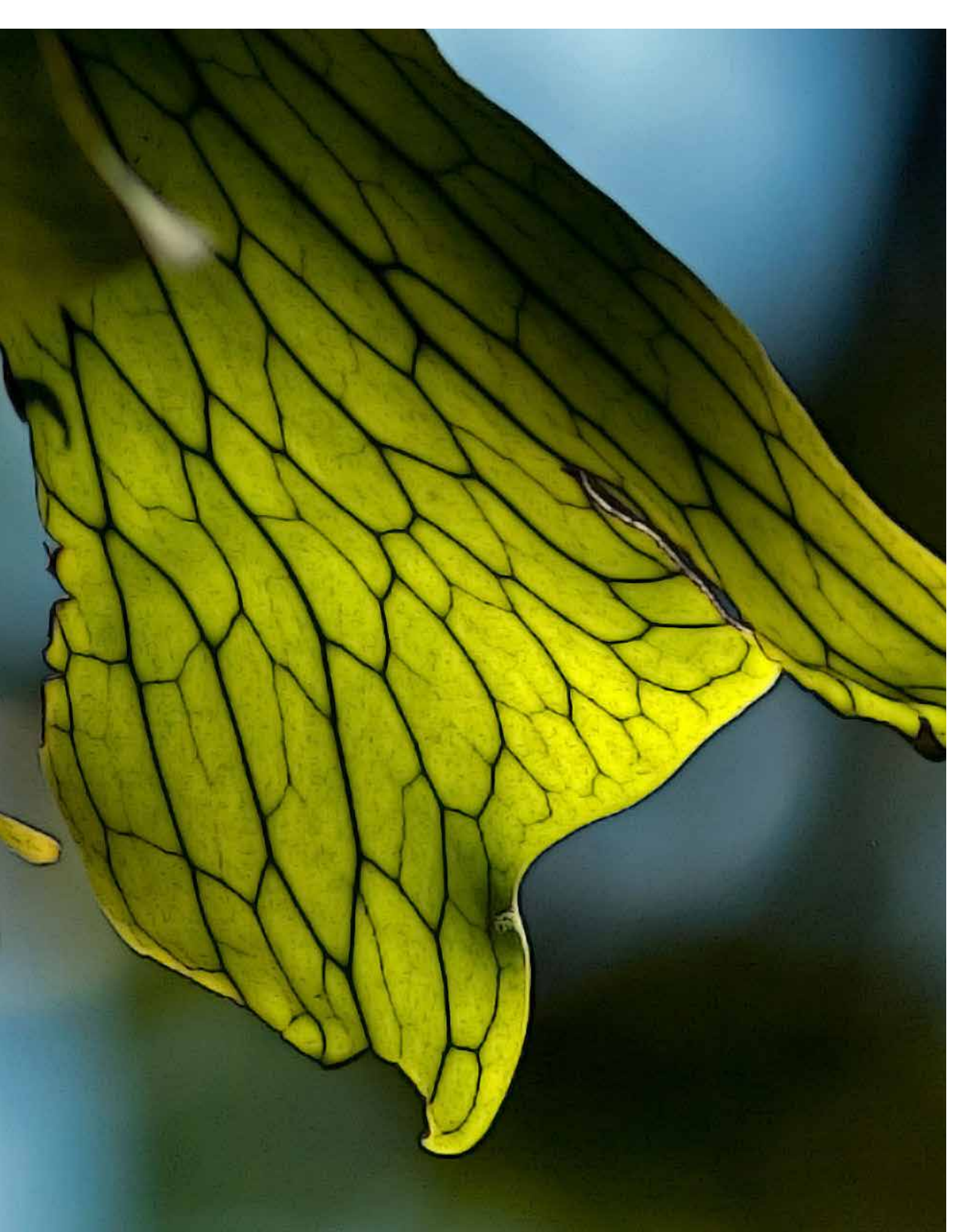
Rating Agencies use consensus criteria entities can achieve to avoid downgrades before they are issued

### Accelerating Forces

- S&P criteria use can serve as underwriting for new insurance products, brand improvement, 30yr. profitable business models
- Government action not required
- Capital markets have more than enough investor funds to pay for solution including through green + resilient bonds
- Green bond growth is explosive
- Rating agencies acknowledge higher ratings for energy efficiency
- Improves public health & environment
- Rebuilds/protects built environment
- Creates estimated \$800B in new wages/400,00 new jobs
- Consensus criteria rating agencies helped initiate are available & similar to existing bond criteria

FIGURE 1

*Data from Capital Markets Partnership (CMP) Green Bond/Sustainable Investment Business Case & RELi Consensus Underwriting Standards supported by U.S. Conference of Mayors (2008), Peer-reviewed & released at NYSE (2009), Updated by Leading Economists (2013), & used by former Republican Treasury Secretary Hank Paulson announcing Climate Bubble (NYTimes, WSJ 2014). Slide development with U.S. Senate Staff and SMP as a result of U.S. Senate Staff Briefing on Climate Credit Rating Downgrades (February 6, 2015).*



# 5.

## CRITICAL NEEDS TO REALIZE THE POTENTIAL OF THE GREEN BOND MARKET

### *ADDRESSING CHALLENGES TO THE LONG-TERM VIABILITY OF THE GREEN BOND MARKET*

Though the green bond market holds great promise, it faces substantial challenges that, if unheeded, could undermine the ability of the market to realize its full potential. One critical challenge is the unregulated use of the term “green” in green bonds. Assuring that the non-financial returns, namely environment performance and climate change mitigation benefits, are being generated from green bond issuances as promised is essential to the long-term viability the green bond market. If green bonds suffer from “greenwash,” false or misleading communications about a green bond’s health and environmental benefits, then the entire premise of this financial instrument may be questioned. The Federal Trade Commission Environmental Marketing Guides and all State Truth in Advertising statutes already regulate the market and can be valuable to recognize and use.

### *SEEKING STANDARDS ENHANCING THE VOLUNTARY GREEN BOND PRINCIPLES*

Green bonds are generally self-labeled, in which widely varying definitions of what constitutes a green bond are employed. The financial industry, in an attempt to provide some unifying principles to guide market participants’ behavior, developed the Green Bond Principles. The Principles call for higher levels of transparency, verification, and reporting to support any green bond issuance. Many green bond issuances follow the Green Bond Principles, though they leave much up for interpretation, and result in various levels of adherence to the spirit of the Green Bond Principles.

The Green Bond Principles encourage standards that can prevent greenwash, with the intent to promote investor confidence and a liquid market, i.e., one that has sufficient economic size and duration whereby an asset can easily be bought and sold without affecting the asset’s price. The Principles also call for transparency and disclosure. The Principles’ 2015 version by the International Capital Markets Association recommends broad categories for green bond projects including, but not limited to:

- Renewable energy
- Energy efficiency (including efficient buildings)
- Sustainable waste management
- Sustainable land use (including sustainable forestry and agriculture)
- Biodiversity conservation
- Clean transportation
- Sustainable water management (including clean and/or drinking water)
- Climate change adaptation

Without specific performance metrics, such broad categories are subject to greenwash from many interpretations and meanings. For example, there are several well-documented greenwash “sustainable” forestry standards. The Principles recommend external assurance and:

*“use of qualitative performance indicators and, where feasible, quantitative performance measures of the expected environmental sustainability impact of the specific investments (e.g., reductions in greenhouse gas emissions, number of people provided with access to clean power, reduction in number of cars required, etc.).”*

Friends of the Earth (2012), BankTrack and International Rivers identify several projects covered by issued “green” bonds that were not green with substantive adverse environmental impacts including waste to energy projects increasing carbon pollution and toxic air emissions. Accordingly, these groups recommend standards to prevent greenwash. Pursuant to truth in advertising law including the Federal Trade Commission Environmental Marketing Guides, broad terms like sustainable, in order to be accurate and not misleading, require evaluating environmental and health impacts over the life cycle of a project and its components including products and materials.





## CRITICAL NEEDS TO REALIZE THE POTENTIAL OF THE GREEN BOND MARKET

For example, see Perkins+Will (2014) White Paper on life cycle assessment (LCA) requirements for green buildings and products stating that ISO LCA standards lack of toxin reporting for LCAs, is in conflict with truth in advertising law and thus greenwash. Applying required life cycle principles, if a nuclear project was considering if it could qualify for a green bond, it should evaluate:

- Uranium mining and resulting carbon energy use, habitat alteration, water and air pollution
- Radioactive waste generation including long half-lives and risk of onsite or offsite storage including release or potential release to the environment
- Reprocessing risk including nuclear proliferation or terrorism
- Potential for radioactive releases to air and water such as from the 2011 Fukushima Daiichi nuclear reactor meltdown in Japan
- Materials and products used to make the facility and their LCA impacts
- Decommissioning including radioactive waste decontamination, and air and water pollution risks
- Any operating environmental and health impacts
- Environmental and health risks from stranded assets without operating income, given that cheaper wind energy on the grid caused announcement of likely shut down of three Illinois nuclear plants (Progress Illinois 2015)

Requirements for certification to leadership sustainability standards have been a long-term important method of eliminating greenwash, as promoted by the leading environmental groups, and a growing number of governments and companies.

A leadership standard requires significant environmental and public health improvements over status quo practices and products.

Given widely recognized increasing global environmental stressors and dangerous climate change, there is no market demand for green financial products that do not meaningfully improve public health and environment. Greenwash is unlawful, in violation of federal and state truth in advertising statutes as well as the Federal Trade Commission's Environmental Marketing Guides. Accordingly, greenwash destroys economic value. Unlike any other field of law, the government has never lost a case when prosecuting greenwash (MTS 1994-2001 Chap. 12, Legal Requirements & Enforcement).

### *EXAMPLE HOW GREENWASH CAN ADVERSELY IMPACT GREEN BOND VALUE*

This Business Case shows that improved indoor air quality in buildings has been documented to increase tenant lease-up and retention and thus is recognized and measured as increasing cash flow, as are healthy products that do not release harmful chemical air emissions. In contrast, some "green" building standards promote toxic products destroying economic value, and are per se greenwash. Further, given the economic power of the chemical industry and its successful restraint of trade complaints against green building standard developers, leadership green building standards are allowing the chemical industry to develop greenwash credits destroying economic value which can be problematic if not corrected at the point of green bond issuance (CMP 2004-2015).

### *ATTRIBUTES OF CONSENSUS UNDERWRITING STANDARDS*

Consensus standards reduce risk and uncertainty for the capital markets which is why they have been adopted and used globally for bonds since the 1980's. The biggest risk they prevent is restraint of trade litigation and liability which has recently stopped progress with the leading green building standards from complaints by the chemical and wood industries. The green building standards went away from being consensus based, thus violating constitutionally protected due process rights of these industries for notice and an opportunity to be heard. Consensus standards are required to be used by the federal government where there is no government standard on the topic pursuant to the Technology Transfer Act and White House OMB Circular A-119.

Underwriting standards identify environmental and resiliency attributes increasing cash flow, require a legally binding certification by a qualified environmental professional verifying each attribute, and were unanimously approved in national democratic votes of approval and supported by many leading environmental groups, financial institutions, manufacturers, product purchasers, governments, and professional firms. The recognized leadership standards preventing greenwash incorporated in the underwriting Standards include (Leadership Standards Campaign 2011):

- Federal Trade Commission Environmental Marketing Guides and Attorneys General Green Guides. The Guides address pollution reduction by requiring accurate and not misleading communications about environmental benefits, including evaluating the entire supply chain of a broad where broad statements are used like sustainability.
- Green-e Power defining renewable power including solar and wind. Over the life cycle, solar and wind have substantially less carbon pollution than carbon intensive power industries especially during operations.
- Forest Stewardship Council (FSC) Certified Wood. FSC has been documented as protecting the forest environment (Perkins+Will 2010)
- USDA Certified Organic Products. USDA organic product rules greatly reduce use of pesticides, fertilizers, herbicides, antibiotics, hormones, genetically modified organisms.
- EPA/Purdue University Agricultural Best Management Practices (BMPs). These BMPs are well recognized as reducing sediment loss and ground and surface water pollution.
- Clean Vehicle Standard. This standard addresses pollution reduction through reduced tailpipe emissions, improved fuel economy, and reduced material use including toxic materials.
- LEED, ENERGY STAR, GreenPoint RATED, Green Star, Climate Neutral Buildings for green properties. Properties certified to these standards can be more energy and water efficient and use less carbon.
- Global Reporting Initiative (GRI) leading Social Equity Indicators. These indicators address important issues including avoidance of child labor, human rights and worker protection, enhancement of communities where manufacturing facilities are located.
- International Agency for Research on Cancer List of Carcinogens, Mutagens and Teratogens. Avoidance of these toxins can improve human and ecological health.
- Precautionary Principle. Use of this principle can enhance protection of public health and environment.

## CRITICAL NEEDS TO REALIZE THE POTENTIAL OF THE GREEN BOND MARKET

- Stockholm and Rotterdam Toxic Chemical Treaties. These Treaties ban the use of listed highly toxic chemicals.
- SMaRT Certified Sustainable Products. This transparent, consensus standard reduces toxin use, mandates social equity requirements, requires reuse, FSC Certified Wood, and life cycle assessment, and provides credit for up to: 100% use by manufacturers of wind or solar, 100% recycled content, 100% reuse.
- Sustainable Furnishings Council Standards. This transparent standard provides credit for manufacturer and retailer reduction or pollution.
- Lacey Act Due Care National Consensus Standard for Legally Logged Wood Defenses to strict criminal liability to protect the forest environment as required by Lacey
- Insurance industry's/FEMA's Fortified resiliency standards. These transparent standards provide specifications protecting structures from more intense wind, precipitation, fire.
- Perkins+Will's and Area Research Resiliency Action List. This transparent consensus list identifies many activities adding economic value that reduce carbon pollution and adapt to climate change.

Equivalent and more stringent standards are incorporated into underwriting standards pursuant to equivalency determination petitions. A leadership standard requires significant environmental and public health improvements over status quo practices and products, and thus is differentiated from greenwash standards which do not. Underwriting standards cover about 90% of global economic activity over the supply chain, and include life cycle assessment (LCA), sustainability, resiliency and productivity for:

1. Buildings
2. Homes
3. Infrastructure
4. Vehicles
5. Manufacturing
6. Retailing

### *ADHERING TO SECONDARY MARKET FINANCING REQUIREMENTS*

Underwriting standards ensure compliance with green property secondary market regulator requirements of the Office of the Comptroller of the Currency, Federal Housing Finance Agency, and Federal Trade Commission to (1) provide prudent underwriting, (2) protect investor and consumer interests, (3) respect existing lien priorities, (4) provide accurate and not misleading data using qualified professionals.

### *RESILIENCY FINANCING NEED*

Added economic value of resilient structures is measured by the underwriting standards to prevent intensifying systemic climate change damages with little or no insurance available. For the US alone, these climate damages are expected to be tens of \$ trillions due to well documented accelerating rising seas and more intense weather and climate events (Climate Ratings Coalition 2015).

*PARTIAL LIST OF GREEN AND RESILIENT ATTRIBUTES INCREASING ECONOMIC VALUE*

There are many green building and sustainability standards and labels but they do not identify or quantify added economic value. Underwriting standards measure added economic value no matter what green certification or leadership sustainability standard is or is not used for attributes increasing cash flow/reducing risk including:

- Energy efficiency
- Water efficiency
- Onsite green power
- Proximity to transit
- Commissioning ensuring the structure was built as designed
- Clean indoor air
- Daylighting improving productivity
- Climate neutral operations
- Integrative process requiring all indispensable parties to determine green property attributes at pre-design and other key stages thus reducing change orders, construction costs, and risk
- Productivity
- Resiliency including requirements to avoid damages in coastal areas subject to expected mean 2' – 4' sea level rise (US Climate Assessment Report (2014) and 500 yr. flood plains (consistent with 2015 Executive Order for federal properties)
- Legally logged wood
- Fuel economy, tailpipe emissions
- Healthy products
- Infrastructure business case development

## CRITICAL NEEDS TO REALIZE THE POTENTIAL OF THE GREEN BOND MARKET

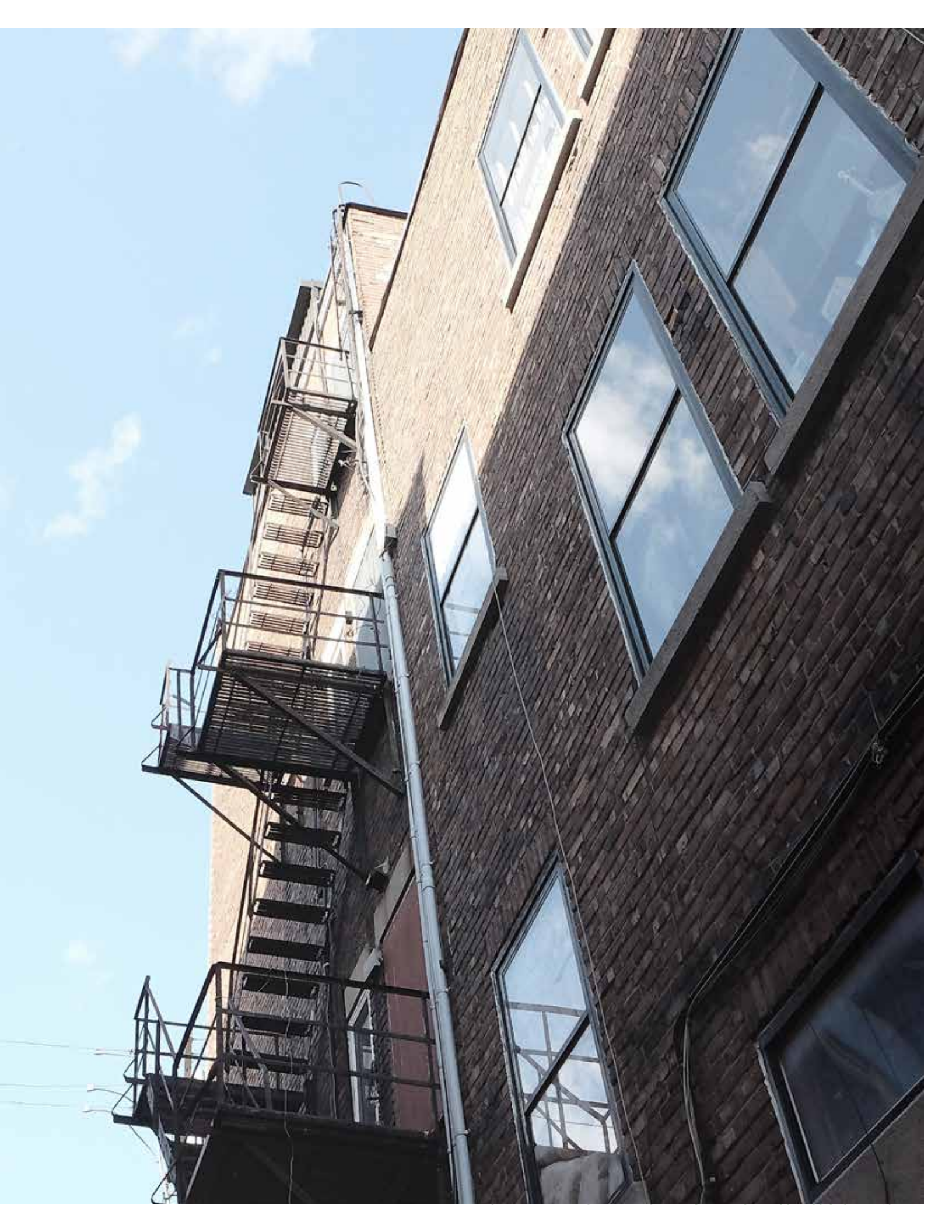
### *LEGALLY BINDING CERTIFICATION OF COMPLIANCE*

Underwriting standards require a legally binding certification to the Federal Trade Commission Environmental Marketing Guides by an environmental professional for each property or portfolio, that the certification is accurate, not misleading, and qualified professionals were used.

Further, for sea level rise and other resiliency sites of avoidance, if the structure is not outside of the hazard zones identified in the standards, a licensed professional engineer must publicly certify that the structure will not be damaged by the increased risk, thus assuming liability if its certification fails. Underwriting standards are similar to the consensus Phase 1 Environmental Site Assessment and Property Condition Assessment (PCA) Standards required for commercial mortgage backed securities (CMBS) reducing legal, technical, and political risk and uncertainty, helping drive CMBS to a \$1 trillion market before the credit crisis. The Phase 1 resolved lender/secured creditor environmental cleanup liability risk that effectively stalled commercial real estate transactions in the 1980s before Phase 1 approval, and was codified by EPA (2013).

### *AFFORDABLE HOUSING BENEFITS THE MOST FROM GREEN ATTRIBUTES*

Underwriting standards also cover affordable housing with green affordable properties benefiting the most of all green properties through utility bill reductions which are a high percent of occupants' income, and clean indoor air reducing the incidence of asthma (CMP 2009). Green + Resilient Value Score covers affordable housing and conventional real estate equally with no difference in approach. At the June 23, 2010 Boston Federal Reserve Bank National Public Meeting on this Business Case, financial institutions funding affordable housing, stated that this added value of green affordable housing allows greater private sector affordable housing financing.



# 6.

## MAKING NEAR-TERM CLIMATE RISK MANAGEABLE

Systemic dangerous climate change damages are causing investor demand for green bonds. Such damages are publicly documented by leading investors, insurers, and governments as set forth herein. Dangerous climate change is recognized by leading climate scientists as greater than 350 parts per million (ppm) atmospheric CO<sub>2</sub>, which is now greater than 400 ppm and rising.

### *GREEN BONDS CAN MAKE CLIMATE RISK MANAGEABLE*

This is due to explosive geometric market growth and expected large market size, with the potential of supplanting all carbon intensive industries. At least 18 gigatons of carbon pollution need to be reduced over the near term at a cost of roughly \$2 trillion to prevent unmanageable dangerous climate change as calculated in this Business case by IPCC scientists, State of California, NASA and JPMorgan. A gigaton is one billion tons, and \$2 trillion is roughly the cost of retrofitting the US building stock with a 40% carbon reduction, which is about 18 gigatons.

### *NEED FOR FAST ACTION CARBON POLLUTION REDUCTIONS*

The leading climate scientists are on record determining that without fast action now, current dangerous climate change can become permanently unmanageable. By fast action, it is meant substantial near term carbon pollution reductions.

*“Current emissions of anthropogenic greenhouse gases (GHGs) have already committed the planet to an increase in average surface temperature by the end of the century that may be above the critical threshold for tipping elements of the climate system into abrupt change with potentially irreversible and unmanageable consequences. ... Scientific and policy literature refers to the need for early, urgent, rapid, and fast action mitigation to help avoid ... abrupt climate changes” (Molina et al. 2009).”*

This fast action determination was recognized by and also set forth by leading States in Connecticut v. AEP (2011):

*“The States caution that the earth’s climate ‘can undergo an abrupt and dramatic change when a radiative forcing agent causes the Earth’s climate to reach a tipping point.’ Carbon dioxide emissions constitute such a radiative forcing agent due to its heat-trapping effects, and therefore, as stated by the National Academy of Sciences, to help avoid ... abrupt climate changes” (Molina et al. 2009).”*

*“the unrestrained and ever-increasing emissions of greenhouse gases from fossil fuel combustion increases the risk of an abrupt and catastrophic change in the Earth’s climate when a certain, unknown, tipping point of radiative forcing is reached.*

*An abrupt change in the Earth’s climate can transpire in a period as short as ten years. Defendants’ emission of millions of tons of carbon dioxide each year contribute to this risk of an abrupt change in climate due to global warming.’*

*As a result, the States predict that these changes will have substantial adverse impacts on their environments, residents, and property, and that it will cost billions of dollars to respond to these problems.”*

Systemic dangerous climate change damages are causing investor demand for green bonds. Such damages are publicly documented by leading investors, insurers, and governments as set forth herein. Dangerous climate change is recognized by leading climate scientists as greater than 350 parts per million (ppm) atmospheric CO<sub>2</sub>, which is now greater than 400 ppm and rising.

This position of the leading climate scientists that fast action now with substantial carbon pollution reductions is required to prevent unmanageable dangerous climate change, was well documented in 2006-2007 in testimony to Congress, IPCC reports, and on 60 Minutes (CMP 2009-2).

Former California Attorney General / current Governor Jerry Brown secured support for the climate risk reduction component of this Business Case from the California Energy Commission, Stanford University, IPCC Scientists, and NASA. Using IPCC and NASA data, these scientists for this Business Case calculated how large a near term carbon pollution reduction is needed to prevent unmanageable dangerous climate change. Using actual average carbon pollution reductions from US green buildings, in 2009 as peer-reviewed and released at a New York Stock Exchange Press Conference, at least 6 gigatons of carbon pollution reduction were needed which could have been achieved by over 3 million green buildings (Id.).

Using this Business Case finding and in order to stimulate the economy and stop unmanageable dangerous climate change, the US Conference of Mayors (2008) adopted a resolution documenting needed near term climate risk reduction to stop unmanageable dangerous climate change by financing of over 3 million green buildings calculated to create a \$1 trillion US private sector stimulus over a period of 5-10 years. The resolution was sponsored by former San Francisco Mayor Gavin Newsom / current California Lieutenant Governor, and former Chicago Mayor Richard Daley, Miami Mayor Manny Diaz, and San Jose Mayor Chuck Reid.

One of the Background Documents released at the New York Stock Exchange Press Conference - Creating an Economic Stimulus report, calculated at page 22 with the State of California, IPCC Scientists, and NASA that in 2008, at least 10 gigatons of carbon pollution needed to be reduced to keep dangerous climate pollution from becoming unmanageable. This reduction could have been achieved by about 5 million green buildings with an average carbon pollution reduction of 40% in operations which was the average for LEED buildings (p. 21).

To account for carbon pollution growth from 2009 - 2013, the Business Case was updated by leading economists led by Nobel Prize Winner Dr. Gary Yohe, IPCC, Vice Chairman, US Climate Assessment Report, documenting that a near term 18 gigaton carbon pollution reduction / \$2 trillion must be made to prevent dangerous climate change from becoming unmanageable and preventing financial contagion. This equates to about a 40% reduction of carbon pollution in the US building stock (CMP 2013). Given the very large amount of investor funds available and funds needed, green property bonds are calculated as being able to reduce this needed amount of carbon pollution.



## MAKING NEAR-TERM CLIMATE RISK MANAGEABLE

Ongoing systemic climate damages in all market sectors are publicly documented by leading insurers, investors, and governments (Id.) The 2014 US Climate Assessment Report concurred with this assessment of ongoing systemic climate damages including rising sea, increased floods, and more intense droughts, precipitation, and wildfires. The Bush II White House Climate Report identified well over 100 specific increased risks from dangerous climate change (CMP 2009). S&P's 2014 announcement of planned climate credit rating downgrades also documented accelerating systemic global climate damages.

### *STOPPING A CLIMATE BUBBLE/CONTAGION*

Rising seas are causing the US military to move all global sea level facilities to higher ground (Pentagon 2014). The Defense Department (2014) recognizes dangerous climate change as a national security threat: "Climate change, energy security, and economic stability are inextricably linked." The Pentagon also published a Fall 2014 Climate Adaptation Roadmap Report on the national security threat of climate change, worked with the White House on the 2015 State of the Union message on the national security importance of climate change and subsequent White House announcement that climate change is a bigger threat than terrorism. The 2014 Report concludes that dangerous climate change poses an immediate threat to national security, with increased risks from terrorism, infectious disease, global poverty and food shortages. It also predicted rising demand for military disaster responses as extreme weather creates more global humanitarian crises.

Former Republican Treasury Secretary Hank Paulson used the Business Case update (CMP 2013) in announcing in the New York Times and Wall Street Journal (April 2014) the need for fast action carbon pollution reduction to prevent a near term Climate Bubble / market crash / contagion. Paulson's announcement was due to the fact that there is no climate solution in place, yet well documented ongoing systemic climate damages exist in all market sectors. Such conditions can undermine needed investor confidence for stable financial markets.

The Climate Bubble is unlike prior market bubbles going back to the 11th Century where there was expectation of economic recovery (Reinart and Rogoff 2011) because as documented by JPMorgan, there is a high probability Black Swan statistical event that dangerous climate change can become permanently unmanageable (CMP 2013).

### *STOPPING PLANNED CLIMATE CREDIT RATING DOWNGRADES*

Figure 1 above was developed US Senate staff as a result of the February 6, 2015 Senate briefing, documents the need for transparent criteria to avoid a likely near term collapse in the financial value of coastal properties, and possible capital markets contagion as argued by Hank Paulson. South Florida coastal mortgage value is threatened due to accelerating rising seas including "sunny day flooding" in Miami, Miami Beach and the rest of the South Florida coast as covered in National Geographic (2015) quoting Dr. Phil Stoddard, South Miami Mayor and Dr. Hal Wanless, Chairman, University of Miami Geology Dept. including the very likely need to retreat inland as the most viable technical solution.

With broad support, Senator Bill Nelson’s Office wrote to Standard & Poor’s (Dec. 13, 2014) recommending in response to S&P planned climate credit rating downgrades: “positive actions reducing risk and increasing economic value, as alternatives to damaging credit rating downgrades for dangerous climate change which raise serious capital markets disruption and national security implications.” Transparent criteria can assist rated entities finance needed resiliency improvements now to maintain or improve credit quality thus protecting investors, the capital markets, public health, the economy, and national security. Transparent criteria used by S&P would be the basis for green bond funding of resiliency for property, homes, buildings, and infrastructure.

Underlying the seriousness of coastal mortgage devaluation for South Florida, there is likely no effective technological sea level rise solution other than retreat inland because sea level rise is occurring from surface tidal water and upwelling beneath the ground through porous bedrock. These dual mechanisms of sea level rise very likely preclude effective sea walls or groundwater pumping. There is a real threat that permanent coastal mortgage holders are at considerable risk of having their assets stranded (re: focus 2014).

Green and resilient bonds are very much needed to finance resiliency from rising seas and more intense weather and climate events.



# 7.

## FINDINGS AND CONCLUSIONS

Green bonds are documented as:

- More profitable
- Less risky
- Preferred by investors
- Creating a substantial financial stimulus
- An important means of preventing dangerous climate change from becoming unmanageable in the near term
- Easily able to pay for an estimated needed near term \$2 trillion carbon pollution reduction to stop unmanageability since investors with over \$70 trillion in assets under management want to buy green bonds



## REFERENCES

1. Tillman, Vickie. (September 28, 2013). President, Morningstar Global Ratings. Speech at Green Building Secondary Market Launch, at TIAA-CREF.
2. Bloomberg 2014 Green Bonds Outlook (June 2, 2014) [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/18/18%202014-06-02-Green-bonds-market-outlook-2014.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/18/18%202014-06-02-Green-bonds-market-outlook-2014.pdf)
3. Zurich. (July 14, 2014). "Zurich champions responsible investing, doubling its commitment to green bonds up to USD 2 billion." <https://www.zurich.com/en/media/news-releases/2014/2014-0714-01>
4. African Development Bank (AFDB). (September 30, 2014). "USD 2 trillion in investments back Green Bonds to tap USD 100 trillion bond market for climate solutions." [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/18/18%20USD%202%20trillion%20in%20investments%20back%20Green%20Bonds%20to%20tap%20USD%20100%20trillion%20bond%20market%20for%20climate%20solutions%20-%20African%20Development%20Bank.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/18/18%20USD%202%20trillion%20in%20investments%20back%20Green%20Bonds%20to%20tap%20USD%20100%20trillion%20bond%20market%20for%20climate%20solutions%20-%20African%20Development%20Bank.pdf)
5. Bloomberg. (February 20, 2015). "Deutsche Bank Seeks to Buy \$1 Billion in Green Bonds." <http://www.bloomberg.com/news/articles/2015-02-20/deutsche-bank-seeks-to-buy-1-billion-in-green-bonds>
6. Pyke, Chris (June 20, 2015). "Digital Realty Trust Issues First Global Green Property Bond." GBIG. <http://insight.gbig.org/digital-realty-trust-issues-first-global-green-property-bond/>
7. Bloomberg (2015). "Clean Energy Investment Jumps 16%, Shaking Off Oil's Drop." <http://www.bloomberg.com/news/articles/2015-01-09/clean-energy-investment-jumps-16-on-china-s-support-for-solar>
8. Clancy, Heather (December 30 2014). "In California, At Least, The Case For Energy Efficiency Is Building." Forbes. <http://www.forbes.com/sites/heatherclancy/2014/12/30/in-california-at-least-the-case-for-energy-efficiency-is-building/>
9. UNC Chapel Hill Home Energy Efficiency and Mortgage Risks (Mar. 2013). [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/8/8%20HomeEE-Report.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/8/8%20HomeEE-Report.pdf)
10. Morningstar Green Property Bonds Rating Working Committee Meeting Minutes (Aug. 1, 2014). In follow-up call after reviewing statistically valid data, higher energy efficiency ratings acknowledged where documented on each green property by Green Value Scores. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/32/32%20Green%20Bond%20Minutes.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/32/32%20Green%20Bond%20Minutes.pdf)
11. Carbon Tracker Initiative. (2015). Unburnable carbon 2013: Wasted capital and stranded assets. <http://www.carbontracker.org/report/wasted-capital-and-stranded-assets/>
12. Climate Bond Initiative (CBI). (2014). Green Bonds Oversubscribed. Database. [www.climatebonds.net/cbi/pub/data/bonds](http://www.climatebonds.net/cbi/pub/data/bonds)
13. First Acacia Capital (2015) List of Oversubscribed Green Bonds totaling \$20 billion. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/18/](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/18/)
14. Capital Markets Partnership (CMP) 2013), Stimulating the Economy While Stopping Irreversible Climate Change Credit Risk Including Contagion© (June 21, 2013). Statistical added green building occupancy, rents, and value graphically depicted in slides pp.26-29. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/4/4%20Updated%20Business%20Case%20.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/4/4%20Updated%20Business%20Case%20.pdf)
15. US Climate Assessment Report (2014). <http://nca2014.globalchange.gov/highlights#welcomefooter-highlights>
16. CO2 Now (May 2015). <http://co2now.org>
17. World Bank Green Bonds 2015. <http://treasury.worldbank.org/cmd/html/WorldBankGreenBonds.html>

18. S&P (2015) Green Bond Index. <http://us.spindices.com/indices/fixed-income/sp-green-bond-index>
19. Barclays (2015) Green Bond Index. [https://www.msci.com/resources/factsheets/Barclays\\_MSCI\\_Green\\_Bond\\_Index.pdf](https://www.msci.com/resources/factsheets/Barclays_MSCI_Green_Bond_Index.pdf)
20. CMP (2009) Capital Markets Briefing Paper. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/BusinessCase/Capital%20Markets%20Briefing%20Paper%20Final-4.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/BusinessCase/Capital%20Markets%20Briefing%20Paper%20Final-4.pdf)
21. UBS (2015) Adding value(s) to investing, (Mar. 2015). [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/18/adding-values-to-investing-2015-03-sustainable-investing.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/18/adding-values-to-investing-2015-03-sustainable-investing.pdf)
22. Standard & Poor's (S&P). (2014). Special Report, Climate Change Preparing for the Long Term (May 28, 2014). [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/33/Climate-Change-Special-Report-Credit-Week.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/33/Climate-Change-Special-Report-Credit-Week.pdf)
23. CMP (2014) S&P Report Demonstrates Imperative Need for Criteria to Avoid Climate Downgrades. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/33/S&P%20Climate%20Report%20Demonstrates%20Need%20for%20Criteria%20to%20Avoid%20Downgrades.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/33/S&P%20Climate%20Report%20Demonstrates%20Need%20for%20Criteria%20to%20Avoid%20Downgrades.pdf)
24. First Acacia Capital (2014). Memorandum Summarizing REPORTS DOCUMENTING SUSTAINABILITY'S POSITIVE IMPACT ON SHARE & BRAND VALUE (Mar. 3, 2014). [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/29/29%20REPORTS%20DOCUMENTING%20SUSTAINABILITY'S%20POSITIVE%20IMPACT%20ON%20SHARE%20%20BRAND%20VALUE.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/29/29%20REPORTS%20DOCUMENTING%20SUSTAINABILITY'S%20POSITIVE%20IMPACT%20ON%20SHARE%20%20BRAND%20VALUE.pdf)
25. Skanska (2013) Press Release on Green Building Market Size (July 9, 2013). [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/4/Skanska%20Release%20Market%20Size.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/4/Skanska%20Release%20Market%20Size.pdf)
26. McGraw-Hill (2013) World Green Building Trends presented at green building secondary market launch at TIAA-CREF. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/4/World\\_Green\\_Building\\_Trends\\_SmartMarket\\_Report\\_2013.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/4/World_Green_Building_Trends_SmartMarket_Report_2013.pdf)
27. Divest-Invest Individual. (September 22, 2014). "Fossil Fuel Divestment Hits \$50 Billion Mark." <http://www.prnewswire.com/news-releases/fossil-fuel-divestment-hits-50-billion-mark-276052971.html>
28. Energy Future Coalition (EFC) (2010) Reinvest in America, Green Property Legislative Campaign
29. CMP (2011) National Builder Survey with Leading Builders of America.
30. Kok (2012), The Value of Green Labels in the California Housing Market. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/8/8%20Green\\_Homes\\_0719121.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/8/8%20Green_Homes_0719121.pdf)
31. MetLife (2013) Certified Green Building Value. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/9/MetLife.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/9/MetLife.pdf)
32. RELi (2014P) National Consensus Productivity Underwriting Standard (Dec. 1, 2014). [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/20/20%20Approved%20Productivity.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/20/20%20Approved%20Productivity.pdf)
33. CMP (2010) Memorandum to Treasury and the Federal Reserve Board on statistically valid data on added value for green properties, (Oct. 15, 2010). [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/4/4%20Treasury%20-%20Fed%20Due%20Diligence%20Review.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/4/4%20Treasury%20-%20Fed%20Due%20Diligence%20Review.pdf)
34. First Acacia Capital (2013-2014) Investor expression of interest letters to buy green property bonds. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/6/](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/6/)

## REFERENCES

35. Forbo Flooring (2001-2011) Sustainable Product Certification Case Study. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/23/SMaRT%20Profitability%202012.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/23/SMaRT%20Profitability%202012.pdf)
36. RELi (2011) National Consensus Sustainable Manufacturing Underwriting Standard. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/20/CMP%20Sustainable%20Manufacturing%20Underwriting%20Standard%20Approved.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/20/CMP%20Sustainable%20Manufacturing%20Underwriting%20Standard%20Approved.pdf)
37. CMP (2001-2013) communications and partnerships with equity funds at Thomas Properties, JPMorgan, Hines, UBS, & Strategic Capital Partners.
38. UNEP (2009) United Nations Environmental Program (UNEP), Buildings and Climate Change: Summary for Decision-Makers. [www.unep.org/sbci/pdfs/SBCI-BCCSummary.pdf](http://www.unep.org/sbci/pdfs/SBCI-BCCSummary.pdf)
39. Kok (2013) presentation at green property secondary market launch at TIAA-CREF).
40. US Green Building Council. (2015). The Business Case for Green Building. <http://www.usgbc.org/articles/business-case-green-building>
41. Meritage (2013) Letter from CR Herro, Meritage Environmental Head, to First Acacia Capital, Oct. 22, 2013). [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/1/1%20CR%20Letter%20for%20Mike.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/1/1%20CR%20Letter%20for%20Mike.pdf)
42. Fireman's Fund (2011) Integrative Process Reduces Risk. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/15/15%20CMP%20FFIC%20Risk%20Reduction%20Statement.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/15/15%20CMP%20FFIC%20Risk%20Reduction%20Statement.pdf)
43. Lacey (2012) National Consensus Lacey Act Due Care Standard for legally logged wood. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/12/12%20Standard%20Unanimously%20Approved%205-21-12.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/12/12%20Standard%20Unanimously%20Approved%205-21-12.pdf)
44. Notre Dame (2013) (The Relationship Between Corporate Sustainability and Firm Financial Performance. <http://business.nd.edu/uploadedFiles/Conlon%20and%20Glavas%202012.pdf>
45. Quigley (2008 & 2009) Doing Well by Doing Good statistical evaluation documenting added green building value. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/BusinessCase/EKQ%20Final%20Final%20Final%20082609.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/BusinessCase/EKQ%20Final%20Final%20Final%20082609.pdf)
46. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/BusinessCase/Doing%20Well%20by%20Doing%20Good%20-%20Green%20Office%20Buildings.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/BusinessCase/Doing%20Well%20by%20Doing%20Good%20-%20Green%20Office%20Buildings.pdf)
47. Quigley (2010) Sustainability and the Dynamics of Green Building finding that energy efficient buildings maintained value during market downturn during credit crisis. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/BusinessCase/EKQ%20Final%20051610%20JMQ.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/BusinessCase/EKQ%20Final%20051610%20JMQ.pdf)
48. Appraisal Institute (2012) Model Green Building & Home Appraisal Scopes of Service. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/9/](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/9/)
49. Leadership Standards Campaign (2011) Leadership Standards Campaign I North America Framework. Leadership Standards & Disclosure Tools. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/34/Leadership%20Standards%20Framework%20Aug%2017%202011.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/34/Leadership%20Standards%20Framework%20Aug%2017%202011.pdf)
50. Statistica Solar (2015) Global Value of Solar Power Market. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/23/statistic\\_id217177\\_clean-energy\\_global-solar-power-market-value-2003-2023.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/23/statistic_id217177_clean-energy_global-solar-power-market-value-2003-2023.pdf)
51. Statistica Wind (2015) Global Value of Wind Power Equipment. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/23/statistic\\_id217174\\_global-wind-power-equipment-manufacturing-market-value-2003-2023.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/23/statistic_id217174_global-wind-power-equipment-manufacturing-market-value-2003-2023.pdf)

52. Idea TechEx (2013) Hybrid & Electric Vehicle Forecasts. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/23/Total%20hybrid%20&%20pure%20EV%20market%20will%20be%20US\\$334%20billion%20by%202023.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/23/Total%20hybrid%20&%20pure%20EV%20market%20will%20be%20US$334%20billion%20by%202023.pdf)
53. FedEx (2001) Delivering a Cleaner Environment Hybrid Truck Ad. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/23/mtsad.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/23/mtsad.pdf)
54. Organic Trade Association (2015) US Organic Industry Survey. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/23/Market%20Analysis%20%7c%20OTA.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/23/Market%20Analysis%20%7c%20OTA.pdf)
55. Transparency Market Research (2012) Global Organic Food Market Size & Share. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/23/Organic%20Food%20Market%20-%20Global%20Industry%20Size.%20Share.%20Trends.%20Analysis%20And%20Forecasts%202012%20-%202018.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/23/Organic%20Food%20Market%20-%20Global%20Industry%20Size.%20Share.%20Trends.%20Analysis%20And%20Forecasts%202012%20-%202018.pdf)
56. FSC (2008 & 2010) FSC Market Facts & Figures 2008, FSC 2010 Market Survey Slides. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/23/FSC\\_Fatos\\_e\\_Mercado\\_Fev\\_2008\\_Ingles.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/23/FSC_Fatos_e_Mercado_Fev_2008_Ingles.pdf) [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/23/](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/23/)
57. US EIA (2010) International Energy Outlook, US Energy Information Administration (2010). [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/23/Solar%20&%20Wind%20Market%20Share%20%7c%20IEA%20.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/23/Solar%20&%20Wind%20Market%20Share%20%7c%20IEA%20.pdf)
58. Statista (2014) Facts on Global Automobile Industry. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/23/%20Automotive%20Industry%20-%20Statistics%20&%20Facts%20%7c%20Statista.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/23/%20Automotive%20Industry%20-%20Statistics%20&%20Facts%20%7c%20Statista.pdf)
59. MTS (2015) internal data on organic and FSC market share.
60. FSC (2010-2) Market Potential of FSC Products. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/23/6-Analysis\\_of\\_market\\_demand\\_of\\_FSC\\_products-EN.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/23/6-Analysis_of_market_demand_of_FSC_products-EN.pdf)
61. Rainforest Alliance (2006) Market Opportunities for FSC Products. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/23/Markets%20for%20FSC%20SouthApps%20d.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/23/Markets%20for%20FSC%20SouthApps%20d.pdf)
62. FSC (2010-3) Business Value & Growth Market Survey. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/23/FSC\\_Business\\_value\\_and\\_growth\\_Market\\_Survey\\_2010.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/23/FSC_Business_value_and_growth_Market_Survey_2010.pdf)
63. (Greenlink Forest Stewards (2011) FSC Market Survey for 12 States. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/23/](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/23/)
64. Deutsche Bank (2007), Deutsche Bank / RREEF Greening of US Investment Real Estate. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/BusinessCase/SO\\_57\\_Greening\\_of\\_US\\_Investment\\_RE.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/BusinessCase/SO_57_Greening_of_US_Investment_RE.pdf)
65. Jones Lang LaSalle (2013) From Obsolescence to Resilience at 4. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/4/JLL-Obsolescence-Resilience.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/4/JLL-Obsolescence-Resilience.pdf). Further, remarks of James Finlay, Appraiser, Wells Fargo at LA Fed National Public Meeting on Green Building Bond Business Case (2011) stated that obsolescence from green buildings is the biggest risk to conventional real estate. Finlay and the Appraisal Institute concluded that it is likely that obsolescence risk could double the 44% green building market share in several years.



## REFERENCES

66. MTS (1994-2001), Sustainable Products Training Manual, Market Transformation to Sustainability (MTS).
67. MTS (2012) (personal conversation with Yankelovich Research conducting market reports on behalf of Proctor & Gamble, Apr. 2012).
68. Forbes (2013) Congrats, Bill Ackman: Bob McDonald Out At P&G, A.G. Lafley Returning As CEO, Forbes May 23, 2013: “McDonald was thought to be in jeopardy of losing his job last summer after a string of reductions to profit forecasts frustrated analysts and investors.”
69. Minnesota Public Radio (2015) Kimberly-Clark and Greenpeace agree to historic measures to protect Canada’s Boreal forest, Greenpeace Canada Aug.4, 2009; 3M to go green on pulp, paper purchases, MPR Mar.5, 2015).
70. CMP (2009-2) Creating an Economic Stimulus & Stopping Climate Credit Risk / Irreversibility, at 7-8, 2009, Business Case Background Document. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/BusinessCase/Creating%20Economic%20Stimulus%20while%20stopping%20Climate%20Credit%20Risk\\_Irreversibility%203.23.08.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/BusinessCase/Creating%20Economic%20Stimulus%20while%20stopping%20Climate%20Credit%20Risk_Irreversibility%203.23.08.pdf)
71. CMP (2009-3) Dispute resolution with the Sierra Club and JPMorgan over Sierra Club internet ad about JPMorgan mountain top removal coal investing, as part of Aug. 2009 NYSE meeting on Green Bond Business Case.
72. Politico (2015) (Inside the War on Coal, Politico, June, 11, 2015). <http://www.politico.com/agenda/story/2015/05/inside-war-on-coal-000002>
73. Guardian (2015) Keep it in the Ground Campaign. <http://www.theguardian.com/environment/series/keep-it-in-the-ground>
74. Friends of the Earth (2012) Issue Brief: Green Bonds.
75. Perkins+Will (2014) Expanding LEED V4 Material Health Transparency. The Lack of Toxin Reporting in ISO EPDs + LCAs is in Conflict with Truth in Advertising Law, Feb. 12, 2014. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/34/LEEDv4-EPD\\_FINAL.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/34/LEEDv4-EPD_FINAL.pdf)
76. Progress Illinois (2015) State Report Examines Potential Impact Of Exelon Illinois Nuclear Plant Closures, Progress Illinois, Jan. 23, 2015.
77. CMP (2004-2015) Communications with green building organizations, law firms involved with the complaints, EPA, Skanska, and chemical industry communications.
78. Perkins+Will (2010) FSC-Equal-Better. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/34/FSC-Equal-Better.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/34/FSC-Equal-Better.pdf)
79. Climate Ratings Coalition (2015) communication to S&P May 20, 2015 documenting little or no insurance for climate damages including Fireman’s Fund Allianz July 2014 communication with California cities, National Association of Insurance Commissioner Climate Change Survey, Aug. 2014, Statement by Nationwide CEO in 1stQ 2010 Earnings Call.
80. EPA (2013) Amendment to Standards and Practices for All Appropriate Inquiries Under CERCLA codifying Phase 1 Environmental Site Assessment Standard used for commercial mortgage backed security bonds, 40 CFR Part 312, Fed. Reg. 78, No. 250 Dec. 30, 2013. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/16/16%20EPA%20Codification%20of%20Phase%201%20ESA.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/16/16%20EPA%20Codification%20of%20Phase%201%20ESA.pdf)
81. Molina et.al. (2009), Reducing Abrupt Climate Change Risk at 1, Proceed. National Academy of Sciences, Aug. 31, 2009. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/5/PNAS-2009-Molina-20616-21.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/5/PNAS-2009-Molina-20616-21.pdf)

82. Connecticut v. AEP (2011) needed near term significant carbon pollution reductions are needed to prevent unmanageable dangerous climate change set forth by leading State government plaintiffs, at 8, No. 05-0514, 2d Cir. Sept. 21. 2009, rehearing denied May 2010) (ruling for the States against the utilities for climate damages) (reversed in part No. 10-174, U.S. S. Ct allowing damage claims against carbon polluters in State Courts (June 20, 2011).
83. US Conference of Mayors (2008) Resolution supporting near term fast carbon pollution reductions to prevent dangerous climate from becoming unmanageable. [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/5/5%20US%20Conference%20of%20Mayors%20Resolution.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/5/5%20US%20Conference%20of%20Mayors%20Resolution.pdf)
84. Pentagon (2014). Pentagon Briefing on Climate Bubble / Crash (Aug. 13, 2014), & Climate Change Adaptation, GAO May 2014.
85. Defense Department (2014) Defense Department Quadrennial Reviews Mar. 4, 2014 & 2010.
86. Reinart and Rogoff (2011) This Time is Different, Eight Centuries of Financial Folly.
87. National Geographic (2015) Price Tag for a Warming Planet & Drowning World, Feb. 2015.
88. re:focus (2014) with results concurring with warnings of coastal property devaluation in July 2014 NYTimes & Guardian, & Feb. 2015 National Geographic. re:focus Miami Beach conceptual engineering report on sea level rise protection 2014, stating that groundwater pumping is only effective with elevated sea walls, and subsurface vertical and horizontal impermeable barriers. Subsurface visual leak detection would also be required based on experience with waste site slurry walls, landfill liners, and national consensus storage tank leak detection standards. Such a remedy for Miami Beach alone would be expected to be over a trillion dollars.

## GREEN BOND BUSINESS CASE PHILOSOPHY

- 1. Meritage Green Home Bond Instruction Letter**  
Directs structuring of Green Home Bonds for Meritage specifying the financial benefits  
[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/1](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/1)
- 2. Green Property Bond Issuer Criteria, & Competitive Advantage**  
Sets forth the critical path steps and timeline for Green Home Bond Issuance, criteria required for issuance, & competitive advantage table  
[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/2](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/2)
- 3. Sustainable Investment Initiative Fact Sheet**  
Summarizes Wall St. Green Home Bond Business Case accomplishments  
[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/3](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/3)
- 4. Wall Street Green Building/Sustainable Investment Business Case Transmitted to Treasury & The Fed**  
Summarizes peer-reviewed Green Bond Business Case released at 2009 NYSE press conference with a link to the: over 30 reports, consensus standards, and investor surveys including statistically valid data documenting that sustainable investment is more profitable, less risky, and preferred by investors. 2013 Update by Leading Economists, & McGraw-Hill Market Share Report (2013). Skanska market size 2013. JLL Obsolescence  
[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/4](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/4)
- 5. US Conference of Mayors Support Resolution for Sustainable Investment Initiative**  
Sets forth support for green bonds by the US Conference of Mayors and the calculated need for substantial bond issuance to stop dangerous climate change from becoming unmanageable in the near term. Related Molina Report on needed fast action.  
[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/5](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/5)
- 6. Expression of Interest Letters From Investors Wanting to Buy Green Bonds**  
Letters of interest to buy green property bonds from Calvert, Legg Mason, Praxis/Everence, and Trillium  
[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/6](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/6)
- 7. Calvert Investors Ranking of Green Home Builders**  
Identifies financial and environmental benefits of national green home builders from an investor's perspective  
[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/7](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/7)
- 8. Statistically Valid Data on Added Green Home Value**
  - a. Green Homes Worth 9% More in CA – Berkeley Haas School**
  - b. Green Homes Have 35% Fewer Defaults - UNC Kenan-Flagler Business School**Studies documenting added economic value of green homes due to energy efficiency which reduces operating costs, and other attributes that buyers prefer  
[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/8](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/8)
- 9. Appraisal Institute Model Scopes of Services for Green Property Valuations & MetLife & Harper Court Certified Green Value Case Studies**  
Identifies green property attributes appraisers recognize as increasing appraised value  
[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/9](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/9)

**10. Green Value Score Summary & Office of the Comptroller of the Currency Requirements It Meets**

Summary of green property underwriting standards, how 25-100 Green Value Score is calculated, and green property secondary financing market requirements that standards meet

[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/10](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/10)

**11. National Consensus Green Home Underwriting Standard/Green Value Score**

Unabridged Green Home Underwriting Standard required to document green home attributes increasing value including energy efficiency for higher credit ratings

[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/11](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/11)

**12. National Consensus Lacey Due Care Standard Providing Defenses to Strict Criminal Liability for Illegally Logged Wood.**

Unabridged standard documents that wood is lawfully possessed and not contraband which importantly is only means for judicial review of Justice Department criminal raids that destroy a company's brand, share value, and incur substantial defense costs.

[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/12](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/12)

Consensus Lacey Act Due Care Certification. Outside of companies that have been prosecuted, very few are aware that Lacey treats prosecuted companies exactly like large-scale heroin dealers. For this reason, without Lacey Act Due Care certification, prosecuted companies only have about a 10% chance of survival.

Lacey Act prosecution risk for builders is very high because wood for homes can come from all over the world, and homebuilders use more wood than any other industry.

Builders cannot rely on statements of their suppliers because builder liability is criminal and thus builders cannot be indemnified. Also, builders are liable without being at fault.

Certification uniquely provides builders a legal opinion on defenses for (1) strict criminal liability, (2) incarceration, (3) fines, (4) armed federal SWAT team raids on corporate headquarters, (5) wood & records seizure/forfeiture as contraband, (6) brand & share value destruction, (7) builders' right to go to court to stop Justice Department criminal raids thus avoiding potential bankruptcy risk suffered by Gibson Guitars and Lumber Liquidators. Certification protects the global forest environment as required by Lacey.

**13. Lumber Liquidator Shareholder Suits due to Justice Dept. Lacey Act Raids for Criminal Illegal Logging.**

Summary of litigation:

[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/13](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/13)

**14. National Consensus Climate Neutral Building & Home Standard**

Unabridged standard that is 10% of Underwriting Green Value Score

[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/14](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/14)

## GREEN BOND BUSINESS CASE PHILOSOPHY

- 15. National Consensus Integrative Process Standard (IP)**  
Unabridged standard documented to reduce change orders by 90% and construction costs by 1%-10%, and part of Underwriting Green Value Score. Fireman's Fund IP Statement identifies documented risk reduction from IP.  
[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/15](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/15)
- 16. EPA Codification of Phase 1 Environmental Site Assessment Standard**  
Standard that First Acacia top management initiated and led approval of required for all commercial mortgage backed securities. Phase 1 is similar in concept to Green Property Underwriting Standards.  
[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/16](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/16)
- 17. CFPB Builder Mortgage Lender Enforcement**  
Mortgage company kickbacks to builders are unlawful.  
[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/17](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/17)
- 18. Green Bond Market Activity**  
Reports indicate explosive nature of green bond market, and excel chart of UBS and other oversubscribed green bonds, & UBS Report on added sustainable investment value  
[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/18](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/18)
- 19. Unibail \$750M Green Home Bond Prospectus Summary- sold out in 2 hrs.**  
Case Study  
[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/19](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/19)
- 20. Underwriting Standards**
  - a. Amendment Incorporating Resiliency/Infrastructure/Productivity**
  - b. Underwriting Standards Article – National Financing Benefits**
  - c. Sustainable Manufacturing**
  - d. Green Buildings & Homes**  
Green Building Underwriting Standard, unabridged amendments, National Public Meeting Slides, & RELi Underwriting Standards Contents
- 21.** [http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/20](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/20)
- 22. Citi Green Bonds Overview**  
Market Outlook & Principles  
[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/21](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/21)
- 23. ENERGY STAR Homes Requirements (Meritage Only Makes ENERGY STAR HOMES)**  
Meritage energy efficient features  
[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/22](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/22)
- 24. Sustainability Increases Economic Value - Philips & Forbo**  
Report & Slide documenting increased financial value, & leadership sustainability industries market value and penetration  
[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/23](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/23)

- 25. Sustainability Increases Brand Value – Conference Board Report**  
Report documenting increased financial value  
[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/24](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/24)
- 26. Sustainability Increases Brand Value – Lippincott Mercer Report**  
Report documenting increased financial value  
[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/25](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/25)
- 27. Sustainability Increases Brand Value – Interbrand Report**  
Report documenting increased financial value  
[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/26](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/26)
- 28. Sustainability Increases Economic Value – Cushman & Wakefield**  
Report documenting increased financial value  
[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/27](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/27)
- 29. Sustainability Increases Economic Value - Forbo Flooring Increased Sustainable Flooring Profitability Part of Business Case Due Diligence Released at NYSE**  
Slide documenting increased financial value  
[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/28](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/28)
- 30. Reports Documenting Sustainability's Positive Impact on Share & Brand Value**  
Memo summarizing key findings  
[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/29](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/29)
- 31. Link to Climate Bonds Website Showing Green Bond Growth**  
List of green bonds issued  
[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/30](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/30)
- 32. [Reserved]**  
[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/31](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/31)
- 33. Morningstar Acknowledgement of Higher Ratings for Energy Efficiency**  
Meeting minutes. In follow-up call after reviewing statistically valid data, higher energy efficiency ratings acknowledged where documented on each green property by Green Value Scores.  
[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/32](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/32)
- 34. S&P Planned Climate Credit Rating Downgrades**
- 35. Leadership Standards Campaign North American Framework & Perkins+Will LCA**  
White Paper, Perkins+Will FSC-Equal-Better.  
[http://mts.sustainableproducts.com/Capital\\_Markets\\_Partnership/DueDiligence/34/Leadership%20Standards%20Framework%20Aug%2017%202011.pdf](http://mts.sustainableproducts.com/Capital_Markets_Partnership/DueDiligence/34/Leadership%20Standards%20Framework%20Aug%2017%202011.pdf)